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PROJECT TALENT, 1-YEAR FOLLOW-UP STUDIES.
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*FOLLOW-UP PROGRAMS, INDIVIDUAL DEVELOPMENT, *CAREER PLANNING, *OCCUPATIONAL CHOICE, *EDUCATIONAL PLANNING, *YOUTH PROBLEMS, SUPPLEMENTARY PROGRAMS, HIGH SCHOOL GRADUATES, HIGH SCHOOL STUDENTS, NATIONAL SURVEYS, PITTSBURGH, PENNSYLVANIA, PROJECT TALENT

THE "PROJECT TALENT" FOLLOWUP STUDIES WERE CONCERNED WITH VARIOUS ASPECTS OF CAREER DEVELOPMENT OF AMERICAN YOUTH, CONSISTING PRIMARILY OF THE EDUCATIONAL AND VOCATIONAL PLANS AND DECISIONS WHICH ONE MAKES DURING HIGH SCHOOL AND IMMEDIATELY FOLLOWING HIGH SCHOOL. RELATIONSHIPS WERE SOUGHT BETWEEN TRAITS EXHIBITED BY STUDENTS IN HIGH SCHOOL AND THEIR SUBSEQUENT VOCATIONAL BEHAVIOR. IN 1960 A PROBABILITY SAMPLE WAS DRAWN FROM 400,000 STUDENTS IN GRADES 9 THROUGH 12, REPRESENTING APPROXIMATELY 5 PERCENT OF THE HIGH SCHOOLS IN THE UNITED STATES. EACH OF THESE STUDENTS WAS ADMINISTERED A BATTERY OF TESTS DESIGNED TO MEASURE APTITUDES AND ABILITY, INTERESTS AND TEMPERAMENT, STUDENT ACTIVITIES, HOME BACKGROUND, AND PLANS FOR THE FUTURE. THE IMMEDIATE PROJECT WAS CONCERNED WITH FOLLOWUP STUDIES OF THIS ORIGINAL SAMPLE UNDERTAKEN WHEN EACH GRADE WAS 1 YEAR OUT OF HIGH SCHOOL AND STAGGERED SO THAT EACH OF THE FOUR GRADES WAS FOLLOWED UP IN A SEPARATE YEAR. EACH GRADE RECEIVED SEVERAL WAVES OF A MAILED QUESTIONNAIRE, SPACED ABOUT 1 MONTH APART. PUNCHED CARDS WERE USED TO PROCESS THE RETURNED QUESTIONNAIRES. A SAMPLE OF NONRESPONDENTS WAS THEN DRAWN (USUALLY 5 PERCENT) AND SOUGHT OUT THROUGH FIELD SURVEYS. DATA GATHERED FROM THESE PERSONS MADE IT POSSIBLE TO ESTIMATE THE CHARACTERISTICS OF THE TOTAL NONRESPONDENT POPULATION AND COMBINE THEM WITH THOSE OF RESPONDENTS. THE COLLECTED DATA REVEALED FACTS WITH RESPECT TO WHAT THESE YOUNG PEOPLE WERE DOING AND THINKING IN THEIR FIRST YEAR OUT OF HIGH SCHOOL INVOLVING THEIR SCHOOLS, JOBS, MARRIAGES, AMBITIONS, AND FRUSTRATIONS. WITH RESPECT TO FURTHER RESEARCH, 5-, 10-, AND 20-YEAR FOLLOWUP STUDIES WITH THIS SAME POPULATION WERE ALSO PLANNED AS SUPPLEMENTARY PROGRAMS. (JH)

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Project TALENT

ONE-YEAR FOLLOW-UP STUDIES

Cooperative Research Project Number 2333

JOHN C. FLANAGAN, Responsible Investigator
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SCHOOL OF EDUCATION
UNIVERSITY OF PITTSBURGH
1966

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Any product of Project TALENT is necessarily the cooperative effort of the entire Project TALENT staff. This report is certainly no exception. On the other hand, there is a certain satisfaction with authorship that must be acknowledged. Also, the professional staff occasionally differ in their views on interpretation, fruitful lines of inquiry, etc. Therefore, the individual primarily responsible for each of the chapters and appendices is indicated at the beginning of each. It also should be pointed out that William Cooley, Janet Combs, and Marion Shaycoft performed editorial functions throughout the volume.

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Chapter 1

Overview and Theoretical Orientation

William W. Cooley

Project TALENT was conceived and organized in the late fifties under the leadership of John C. Flanagan. The goals of Project TALENT were and continue to be: (1) to develop an inventory of human resources, (2) to develop a set of standards for educational-psychological measurement, (3) to prepare a comprehensive counseling guide indicating the patterns of aptitude and ability which are predictive of success and satisfaction in various careers, and (4) to provide a better understanding of the educational experiences which prepare students for their lifework.

In 1960 a probability sample of approximately 5 per cent of the high schools in this country was drawn. The 400,000 students in grades 9 through 12 attending those randomly selected schools were administered two days of educational-psychological tests and inventories. Those instruments were specially constructed for this project. Included were measures of specialized aptitudes and general ability, interests and temperament, and almost 400 items on student activities, home background, and plans for the future. Over 1,000 test scores and items are available for each student on our computer tape file. Chapter 4 describes the general nature of that 1960 battery.

This report is concerned with the follow-up studies of the original 1960 sample undertaken when each grade was one year out of high school. These follow-up studies were staggered so that each of the original grades was followed up in a separate year. That meant we had to find only about 100,000 people a year which, of course, made life very easy! Table 1-1 summarizes the schedule of completed and projected follow-up studies.

The follow-up for a given grade included three or four waves of a mailed questionnaire. Each wave was spaced about one month apart, and reminder cards were sent in between waves of the questionnaire--one or two, depending upon the wave. As soon as the returns came in, a large corps of coding clerks processed the questionnaires, and a punched card was prepared for every questionnaire returned. This card contained information as to whether or not a usable questionnaire had been obtained from the student. These cards, in turn, were used to control the preparation of mailing labels for the second wave, including corrected addresses of those questionnaires returned by the post office. This process was repeated for the third and fourth waves.

Following the mailed survey, a sample of the nonrespondents was drawn (usually 5 per cent) and sought out through field surveys conducted by Regional Coordinators and finally by the Retail Credit Company. They know how to locate the very hard-to-finds. This sample of nonrespondents made it possible to estimate the characteristics of the nonrespondent population and combine them with those of the respondents. Thus we can estimate many population frequencies regarding different types of post-high-school decisions and the attributes of the people who made them. The mechanics of this entire follow-up operation are discussed in detail in Chapter 2, to aid in the conduct of future longitudinal research.

Table 1-1

Project TALENT Follow-up Questionnaire Timetable

Grade in 1960	1-year Follow-up	5-year Follow-up	10-year Follow-up	20-year Follow-up
12th	1961	1965	1970	1980
11th	1962	1966	1971	1981
10th	1963	1967	1972	1982
9th	1964	1968	1973	1983

Theoretical Orientation

The Project TALENT follow-up studies are primarily concerned with various aspects of career development of American youth. We have studied the nature of their employment and job satisfaction, the nature and extent of their post-high-school education, and their long-range career plans.

The theoretical orientation to career development represented in this report is an extention of the classical trait and factor approach. Certain traits are measured on high-school students, these high-school students are then followed, and relationships are sought between the traits exhibited by the students in high school and their subsequent vocational behavior. This criterion behavior includes their career plans and decisions, and job satisfaction and success.

This project has made several improvements over most previous applications of a trait and factor approach. For one thing, the initial measurements were made on high-school youth, not on adults working in certain positions. In this way we can tell what high-school students look like who later become successful and satisfied workers in a particular area in addition to telling high-school students what workers do in that particular area. Another improvement on the traditional trait and factor approach is that with the aid of multivariate analysis, we are considering patterns that are occurring in the data rather than looking at one trait at a time.

The primary aspects of career development which are of concern in this report are the educational and vocational plans and decisions which one makes during high school and immediately following high school. These decisions are assumed to be, in part, a function or manifestation of personality.

In this context, personality is defined in terms of the conceptual scheme used to summarize and interpret previous responses of the person and to anticipate future responses. Personality is a theoretical interpretation of the person's behavior which is derived from all of his previously observed behavior. This definition of personality follows McClelland (1951), and includes intellectual functioning.

Many different types of conceptual schemes have been advanced for dealing with personality chiefly because psychologists deal with many different kinds of problems. Factor theory is a particularly operational scheme for describing the current personality of a person. That is, over short periods of time, factor theory serves as a useful and economical model to account for the previously observed sample of behavioral responses and to predict what responses are likely to occur in the near future. The length of time over which predictions are valid depends upon the relative stability of the individual's personality under investigation and the type of prediction attempted.

In the factorial conceptualization of human behavior, personality has its locus in an m-dimensional space. An individual's personality is his unique location in this space, the location determined by the total pattern of the m behavioral measures which are available for that individual. People who have similar patterns of test scores (or factor or discriminant scores) will occupy the same region of this m-dimensional space. That is, people who behave similarly have similar personalities. People with similar personalities tend to make the same types of career decisions. Once the regions of the test space or discriminant space occupied by people making particular types of career decisions are defined, the probability that a person will make a certain decision can be estimated.

For example, if a decision between two alternatives has been made by individuals located in the behavioral space, such as (A) college-preparatory curriculum in high school and (B) not college preparatory, the behavioral space will contain regions in which many individuals chose A over B, other regions in which choice B was preferred to A. There may be at least some A choosers in all regions of the personality space, but the A density varies from region to region. Comparison of the density of A and B choosers at a particular point in the space indicates the probability that choice A will be made by persons at or near that point. This scheme of analysis is generalizable to decision-making situations involving more than two alternatives.

Parallel to the follow-up investigations reported here we have been conducting a series of factor analytic studies of the Project TALENT battery, both on the 1960 data across grades and, using the 1963 retest data, across time for the same group of students. One product of this line of work will be a monograph (available fall 1966) which will relate our factor analytic work across grades to the body of knowledge that has grown out of the factor analytic approaches to the study of human behavior as exemplified by Kelley, Guilford and Cattell. The retest study results (available sometime during the summer of 1966) enable us to talk about the stability of basic dimensions over time. Both studies will make it easier for us to consider career development as an aspect of personality development, as do most active researchers today.[1]

One important by-product of these studies will be a standard set of dimensions which can be used for students tested in all four grades. This will improve future follow-up studies by allowing us to pool data from the different age groups, since our criterion data will be collected at the same stage of career, regardless of original grade tested.

We have also been working very hard on the problem of how to improve the classification of career plans. Almost any study of career planning depends upon how you categorize plans in the first place. We are evolving a scheme of classifying plans which begins with very gross categories in high school. As the students get older, they must make finer distinctions in their planning and in choosing options. As this happens, we need more refined occupational classification categories. Our approach is developmental in the sense that the degree of specificity with which we classify plans and goals depends upon the age and educational level of the student. By linking our interest in predicting career plans to studying career development, we feel we are evolving a useful framework for guidance purposes. This means that the classification scheme can then deal with the types of decisions which the students must make at the time they need to make them.

The size of the Project TALENT sample and the vastness of the follow-up task often force one to ask the question, "Is this large sample really necessary?" It is in the current follow-up studies of career plans and patterns that the real need for the large sample has been brought home. There are so many different possible career patterns following high school that, when one is interested in studying a particular pattern, the large Project TALENT sample size is essential.

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[1] See, for example: Bordin, Nachman, and Segal (1963), Holland (1963), Roe (1956), Super (1957), and Tiedeman and O'Hara (1963).

In this concern for change over time we are also demonstrating the utility of a trait and factor approach in the study of process, as well as for purposes of description. We are interested in considering the patterns of attributes that are related to the sequence of decisions which students make as they move through our schools and into the adult world of work. This requires a very large sample.

Summary of Findings

Chapter 3 describes the activities and plans of American youth one year after high school. These activities and plans as related to data collected in 1960 are discussed in Chapters 5 through 10.

Chapter 5 reports the differences among students who selected different types of post-high-school education. Both ability measures and family socioeconomic environment are very much involved in determining the particular type of post-high-school institution a student enters. One interesting trend seems to be that junior college students tend to be more like noncollege individuals in ability and more like college students in terms of socioeconomic factors. In spite of slight sex differences, this holds true generally for both males and females. One product of this chapter is an expectancy table which estimates, from knowledge of a high school student's general scholastic ability and his family's socioeconomic status, the probability that he will go to college.

Two lines of inquiry are described in Chapter 6. Both the attributes of students selecting various college majors and the differences among students attending different colleges are discussed. Not only is the decision to go to college important, but the particular college or university the student attends is also a factor determining what he does during his adult life. In other studies of the career process, the investigator has been able to do little more than consider whether or not the subject attended a college. Because of the large Project TALENT sample, it is now possible to study how colleges differ in the types of students they admit and graduate; these differences, in turn, may affect such things as the student's success in school, choice of college major, whether he graduates or not, whether he attends graduate school or not, and the nature of his employment following college.

In a previous report[1] the Project TALENT staff had been working on the problem of developing a taxonomy of colleges. Recently, we have been taking a slightly different tack. We now feel that a trait model is potentially more fruitful than a taxonomy. Instead of trying to develop separate categories into which institutions can be placed, we are trying to define the dimensions along which individual institutions differ. Although preliminary clustering of single institutions may be necessary prior to determining the dimensionality, a trait model should be most useful in the final analysis.

In our concern for higher education we have not forgotten the student who goes directly to work following high school. One aspect of work reported in Chapter 7 is the difference between those working in jobs who plan to remain on those jobs and those who plan to change to some other type of employment. One interesting finding here is that, when we eliminated from job categories those workers who expressed a plan to change from that type of work, the profiles of the occupational groups were much sharper; that is, the differences among job groups were greater on the predictor attributes and the standard deviations or variations within job groups were smaller. This series of analyses provides further evidence regarding the predictive validity of the TALENT battery, not only for occupational group membership but also for the potential job satisfaction for a particular occupation.

The extent to which young people change their career plans between high school and one year after high school is summarized in Chapter 8. Although the exact extent to which high-school plans are stable depends upon the grade and sex of the student, the generally low percentages found (between 17 and 41 per cent stable) have important implications for guidance. These unrealistic and unstable plans cannot be expected to be an effective source of motivation for the developmental program of the sutdent.

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[1] See Appendix L, The American High School Student.

Chapter 9 considers the extent to which those plan changes are related to the TALENT battery. By identifying and examining groups of grade 9 boys who made specific types of career plan changes, we can say quite conclusively that the tests administered in grade 9 are capable of anticipating the type of "career sorting" that will take place during and immediately following high school.

In Chapter 10 we attempt to consider career plan groups which are more specifically defined than those used in Chapter 9. The results indicate that for our five-year follow-up studies we will be able to consider narrower career plan and job categories.

Chapter 11 outlines the implications which these results have for educational guidance and outlines research and development activities that will be necessary to get them implemented. One obvious conclusion is that the results of Project TALENT can have an important impact on high-school guidance when combined with the active use of the computer.

Chapter 2

The Follow-up Procedures

Susan J. Becker and William W. Cooley

In 1961 Project TALENT began follow-up studies of the students tested in 1960 when they were in grades 9 through 12. Questionnaires were mailed to the members of each of these classes approximately one year after high-school graduation--grade 12 in 1961; grade 11 in 1962; grade 10 in 1963; grade 9 in 1964. Over 400,000 young people were sent questionnaires. Data were also collected from a sample of nonrespondents from each grade.

Before setting up this large-scale study, an extensive literature survey was made to learn the specific follow-up procedures used in other longitudinal research. Although many such studies had been conducted, surprisingly few details were available. Three projects which gave some specific information regarding their follow-up procedures are described below; however, even in these studies information concerning cost, best methods of mailing, and most effective means of contacting nonrespondent groups was not provided.

In the first of these projects, Dr. Lewis M. Terman began a longitudinal study of 1,400 gifted children in 1921 (Terman and Oden, 1947). The sample was selected on the basis of teachers' nominations of the three brightest children in the class as well as the youngest student. The children were first given a group test; those scoring highest were then given the Stanford-Binet test. The final sample consisted of children whose I.Q. scores fell within the top 1 per cent of the entire school population (140 and above). Terman administered a complete battery of tests and various interest, socioeconomic, and personality inventories to these children. In addition, home and school information blanks were filled out by their parents and teachers, respectively. Follow-up studies were then conducted in 1927, 1936, 1940, and 1945, the first two by mail and the last two by interview. During the years that these children remained in school, follow-up information blanks were also sent to both parents and teachers. In

1940 Terman employed several clinical psychologists to conduct personal interviews with as many of the original sample as possible. Although Terman did not give details on any of the specific problems found in contacting his sample, he did mention that a small percentage was lost through insufficient addresses and that a still smaller percentage was not entirely willing to cooperate in the intensive interviews. In spite of the time required to complete these interviews, Terman was able to maintain 93 per cent of his sample as late as 1945. This high response rate was probably due to the fact that these subjects, who were themselves gifted, understood the significance of his studies for improving the education of gifted children.

Another follow-up study was carried out by Flanagan in 1935 and reported by Dearborn and Rothney (1938) in connection with a Human Growth Study at Harvard. The series of eight mailings (one a week for eight weeks), followed by 90 phone calls and 225 personal visits, resulted in a response rate of 88 per cent of the 1,541 in the sample. However, only subjects for whom good addresses were available were included in this survey. Fifty-one per cent of the sample returned questionnaires during the first two mailings. Of the 204 nonrespondents, 38 refused to reply, five were deceased, and the remaining were confined to penal and mental institutions, in the Armed Forces, members of religious orders, or out of contact with their families.

In 1955 Thorndike and Hagen (1959) did a follow-up study of the careers of 17,000 men who had taken the Aviation Cadet Qualifying Examination in 1943. One-page questionnaires and letters were mailed in three waves, four weeks apart. Results of the survey showed that 51.3 per cent responded to these mailed questionnaires. No acceptable addresses were available for 14.4 per cent, and 19 per cent did not respond although the addresses were presumably correct (not returned by the post office). Another 15 per cent were eliminated from the survey, since they were still in military service or deceased. Because of the bias in the respondent group, the Retail Credit Company was employed to follow up a small sample of the nonrespondents by phone calls and interviews, raising the completed questionnaire percentage to 58.

None of these studies provided complete information about techniques and costs involved in longitudinal research. This chapter, however, will describe the follow-up procedures used by Project TALENT in an attempt to contribute to the further development of a follow-up technology. Four aspects will be discussed: (1) questionnaire format, (2) mechanics of mailing, (3) response rates, (4) questionnaire processing methods.

The Mailed Questionnaire

Questionnaire Format. In 1961 eight-page questionnaires were sent to the young people tested when they were in the twelfth grade. The remaining three grades were sent four-page questionnaires. Although the questionnaires sent to each class were different, the staff was careful to include in each one all items vital to the study of further education, jobs, and career plans. (The questionnaires sent to each grade are in Appendix A.)

Mechanics of Mailing. Slight variations also occurred in the procedures used for mailing follow-up questionnaires and reminder cards to each of the four classes, as indicated in Figures 2-1 through 2-4. For example, questionnaires were mailed to the twelfth-, tenth-, and ninth-grade classes in four waves, while the eleventh-grade questionnaires were sent out in three waves. The major differences among grades, however, occurred in the number and spacing of reminders sent after each wave of questionnaires. In the twelfth-grade study, for instance, a reminder card was sent two weeks after the first questionnaire, followed in two weeks by the Project TALENT News[1], and in another two weeks by a second reminder card. In the tenth-grade study, a reminder card was sent only after the third wave of questionnaires.

Response Rates. A comparison of response rates among and within grades is shown in Table 2-1. While the twelfth-grade follow-up rate was highest, it must be remembered that this study took place only one year after the initial testing. Addresses were still fairly recent,

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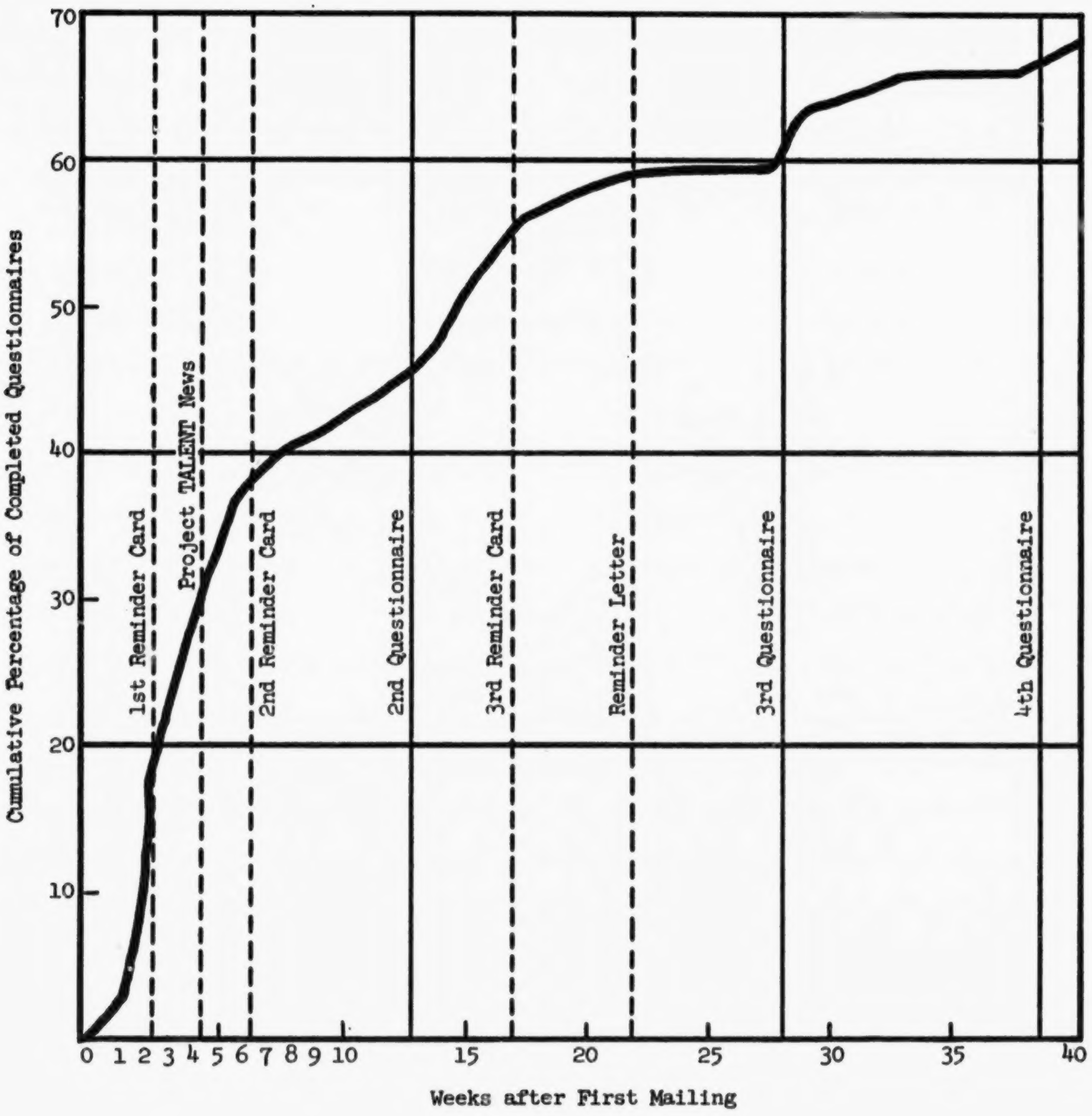
[1] This is an annual newspaper prepared especially for the participants. Copies are available upon request.

Figure 2-1

Weekly Mailing Schedule and Response Rate

Twelfth Grade

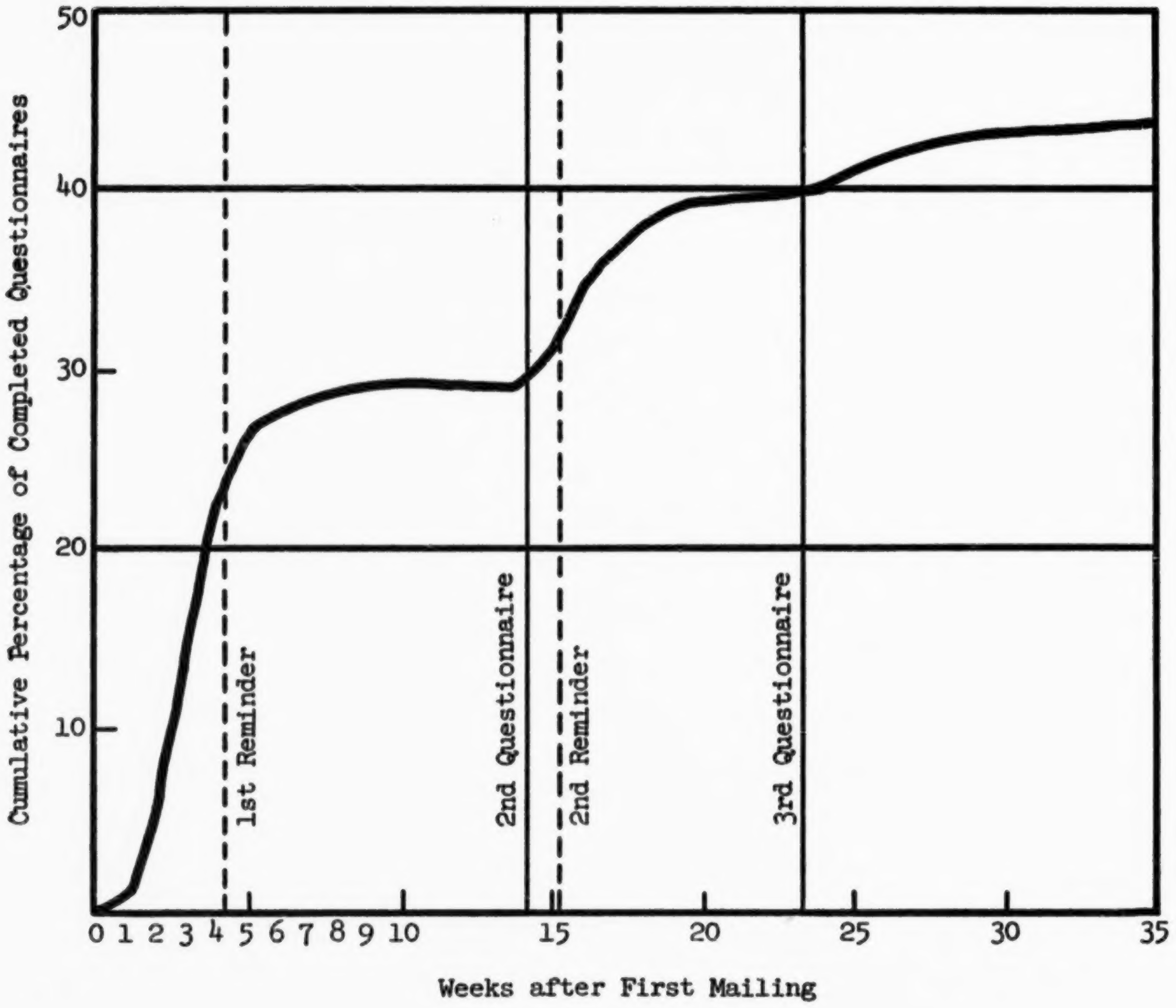


June 1961

Figure 2-2

Weekly Mailing Schedule and Response Rate

Eleventh Grade

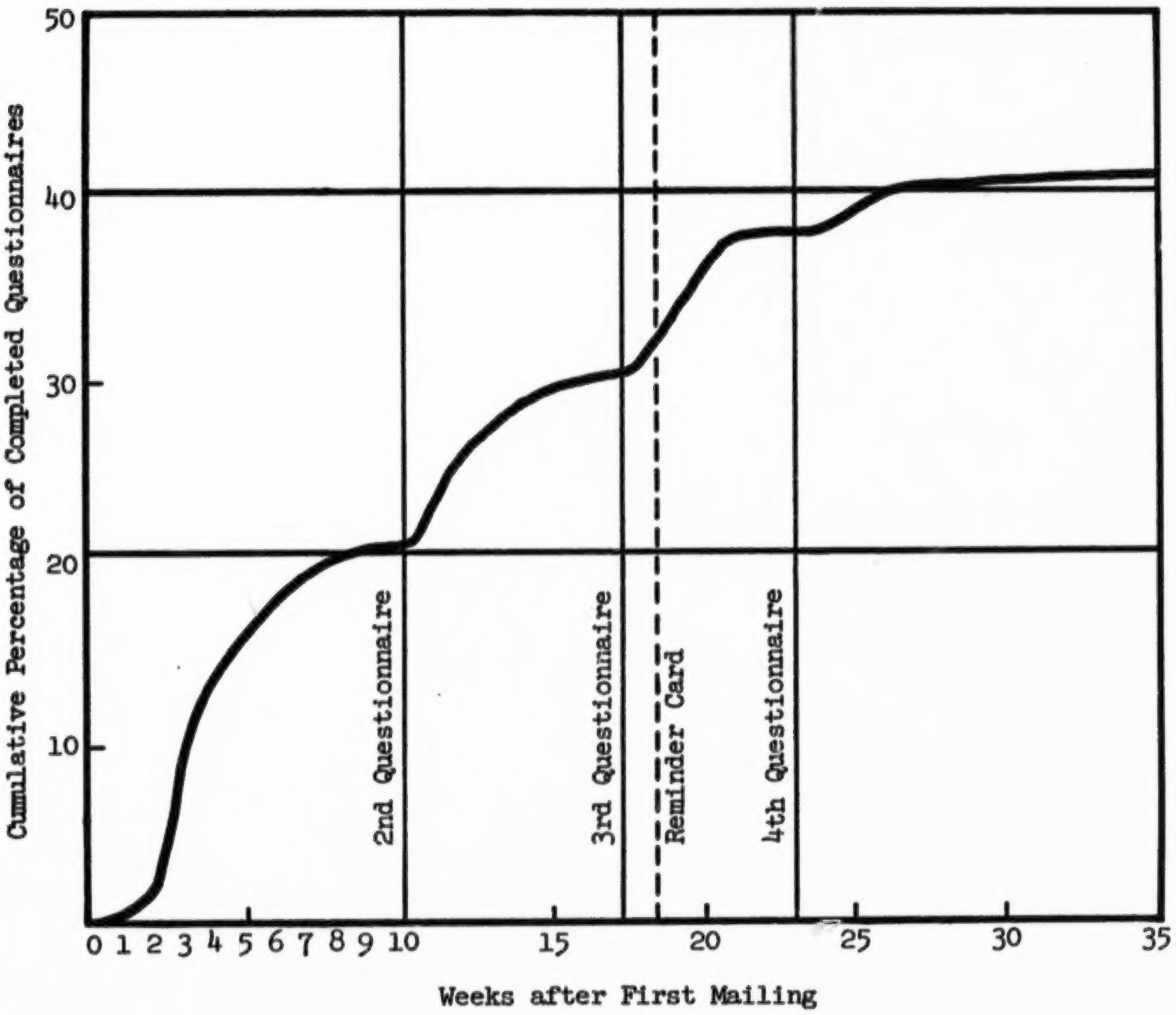


May 1962

Figure 2-3

Weekly Mailing Schedule and Response Rate

Tenth Grade

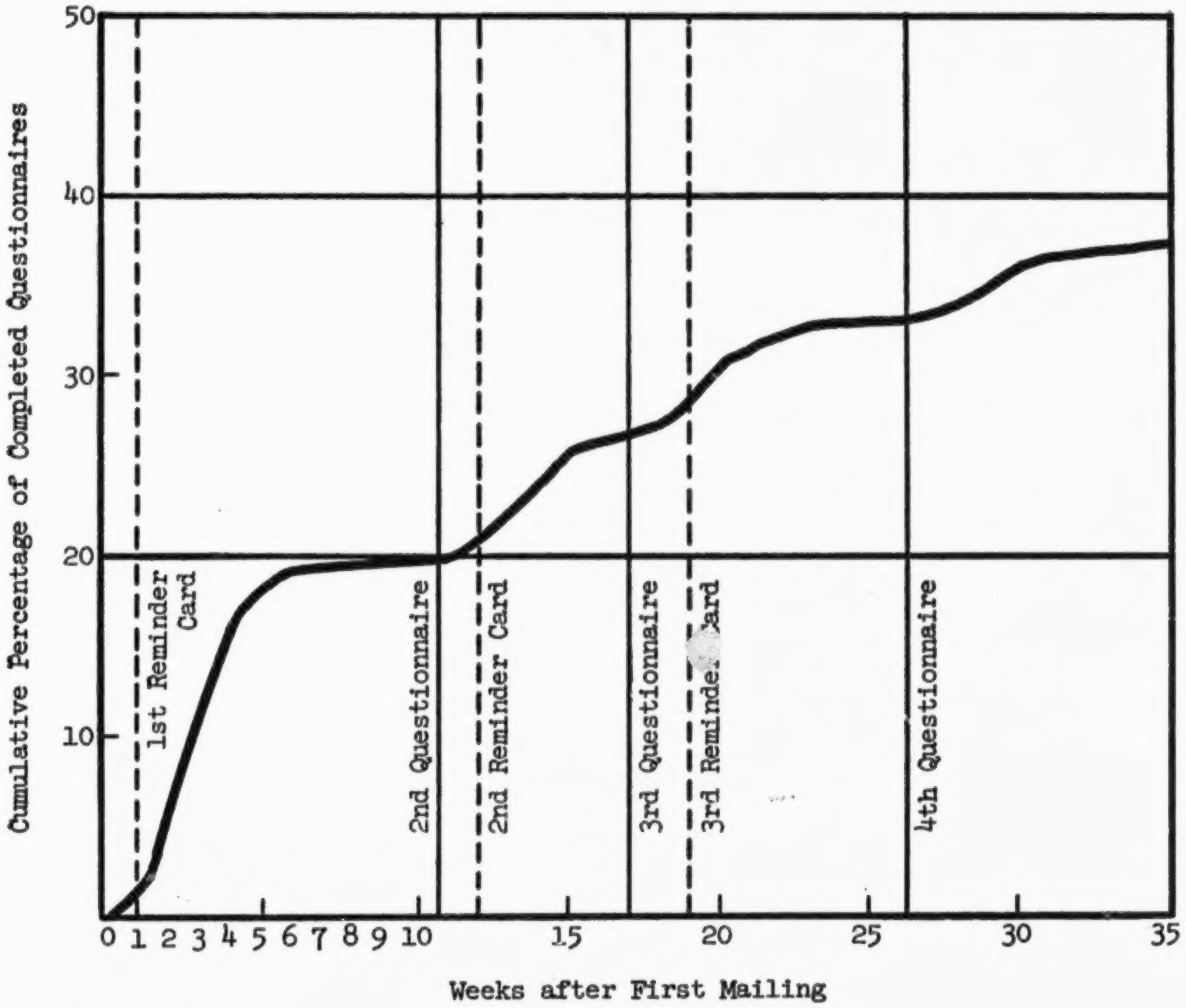


December 1963

Figure 2-4

Weekly Mailing Schedule and Response Rate

Ninth Grade



August 1964

Table 2-1

Comparison of Response Rates for Mailed Questionnaires

Grade and Wave	Number Returned	Per Cent Returned of Total Sample	Per Cent Returned of Total Mailed in That Wave
Twelfth Grade			
1st Wave	38,790	45%	45%
2nd Wave	14,300	15%	28%
3rd Wave	5,200	6%	14%
4th Wave	2,800	3%	10%
Total	61,090	69%	
Eleventh Grade			
1st Wave	28,484	28%	28%
2nd Wave	12,207	12%	19%
3rd Wave	5,087	5%	9%
Total	45,778	45%	
Tenth Grade			
1st Wave	25,150	21%	21%
2nd Wave	11,976	10%	13%
3rd Wave	8,383	7%	11%
4th Wave	5,988	5%	8%
Total	51,497	43%	
Ninth Grade			
1st Wave	23,219	19%	19%
2nd Wave	8,554	7%	9%
3rd Wave	7,332	6%	8%
4th Wave	6,110	5%	7%
Total	45,215	37%	

and the students could remember Project TALENT more easily than two, three, or four years later. Subsequently, the percentage returns decreased for each successive grade as the number of insufficient addresses increased and as students began to lose interest in the testing program.

Questionnaire Processing Method. When a completed questionnaire was received, a card was punched showing student testing number, week received, form number containing a mailing wave indicator, and a code showing whether the questionnaire was completed by the individual himself or by someone else. The respondent's name was then deleted from the mailing list for the next wave. The answers to the questionnaire were later coded, punched onto cards, and transferred to magnetic tapes on which were previous data for that individual.

Incomplete questionnaires were also processed. These questionnaires were returned by the post office whenever the individual had moved from the address on the mailing label. If the post office had a new address, this change was made on our records and used in the next mailing wave. Questionnaires returned with no new address were coded to show the week received and the reason for the return, such as no forwarding address or addressee unknown. The names of young people who had died were, of course, removed from the mailing list.

Follow-up of the Nonrespondents

Between 31 and 63 per cent of the young people who were sent questionnaires did not respond depending upon the year of follow-up. Knowing that these young people differed from those who did respond, Project TALENT conducted four special surveys to locate approximately 5 per cent of the nonrespondents from each grade. These four samples were randomly selected from the entire nonrespondent group in each class.

Questionnaire Format. The special survey questionnaire used in 1961 for the twelfth-grade nonrespondents was designed for an interview situation. Because the data from these forms were difficult to merge with the data from the respondents' mailed questionnaires, the format was changed in both the eleventh- and tenth-grade studies to more closely resemble the mailed forms. In the ninth-grade survey the format was made identical to that of the mailed questionnaire. In this way data could be combined easily, and differences between the respondents and nonrespondents could be studied more closely. (The special questionnaires are also in Appendix A.)

Procedures. Methods for contacting the nonrespondent sample differed in each of the four follow-up studies. At the beginning of the twelfth-grade nonrespondent study, questionnaires were sent out simultaneously to the participating high schools and to the Regional Coordinators listed in the acknowledgment section of this report. The sample was almost equally divided between the two. The Coordinators, mainly from the fields of personnel, psychology, education, or counseling, had supervised testing in 1960. In the follow-up studies their function was to locate nonrespondents within a 100-mile radius of their offices. The remaining non-respondents were initially assigned to the principals of the schools they had attended.

The eleventh-grade special questionnaires were initially sent to the high schools. The questionnaires not completed by the schools within two months were then sent to the Regional Coordinators. Because it seemed more desirable to have the high schools contacted on a more personal and direct basis, and because excessive staff time was required in this study to contact each high school and to maintain an accurate record of the status (complete or incomplete) of every questionnaire, responsibility for local coordination of the tenth-grade special survey was placed entirely with the Regional Coordinators. Each Coordinator contacted cooperating high schools in his area, asking high-school personnel to complete as many questionnaires as possible. The Regional Coordinators were responsible for any questionnaires not finished by the schools. However, the time needed to contact some of the students, to send materials, and to maintain records far exceeded the time available to many of the teachers, principals, and professors who served as Coordinators. Thus, although 2,243 of the 2,808 completed questionnaires were filled out through the combined efforts of high schools and Coordinators, procedures were again re-evaluated for the ninth-grade special survey.

In the first three special surveys (twelfth through tenth grades) all questionnaires not completed by the Regional Coordinators or the high-school personnel were sent to the Retail Credit Company. Their staff of full-time investigators throughout the United States and some foreign countries enabled them to contact students, parents, relatives, and neighbors regardless of location. In each of these studies, Retail Credit was able to bring the number of completed questionnaires above the 90 per cent level. Because of these successes and Retail Credit's estimate of two months for completing the special survey, the entire ninth-grade nonrespondent study was assigned to the Retail Credit Company. Their investigators were given a one-hour limit for each questionnaire based on two assumptions. First, those young people who had not moved during the four years since the original testing could be located easily and interviewed in less than one hour. Second, costs could be kept to a minimum until the amount of time and expense involved in finding an individual could be estimated from the initial hour's search. If further attempts to locate this hard-to-find individual seemed too costly, the search for him could be discontinued.

Response Rate. The response rates in the special surveys were 99 per cent, grade 12; 90 per cent, grade 11; 93 per cent, grade 10; and 73 per cent, grade 9 (Table 2-2). The low rate of response in the ninth-grade survey was due mainly to Retail Credit's inability to locate many of the nonrespondents within the allotted time and our lack of funds for increasing the time limit on difficult cases. In considering the amount of time that had elapsed since the original testing of the ninth-grade students, we might expect that the rate of return would be less for this grade than for the other grades. However, relatively new addresses were available for at least part of the nonrespondent sample, since they were retested in 1963. Yet, for the remaining 27 per cent of the nonrespondents, no good leads were available.

Table 2-2

A Comparison of the Nonrespondent Studies[a]

Grade	Total No. of Cases	Number Completed	Per Cent Completed	Cost Per Nonrespondent
Entire Nonrespondent Study				
12th	1,341	1,334	99%	$ 7.77
11th	2,901	2,638	90%	7.04
10th	3,009	2,808	93%	6.57
9th	3,202	2,334	73%	9.66
Questionnaires Completed by High Schools				
12th	642	532	83%	.37
11th	2,901	1,181	41%	.17
10th	3,009	1,458	48%	1.26
Questionnaires Completed by Regional Coordinators				
12th	699	648	94%	10.00
11th	1,720	1,113	65%	10.96
10th	1,551	785	51%	9.97
Questionnaires Completed by Retail Credit Company				
12th	141	134	95%	16.25
11th	581	346	60%	14.06
10th	766	559	73%	10.75
9th	3,137	2,255	72%	9.66

[a] Any discrepancies between the total number of questionnaires completed by the schools, Coordinators, and Retail Credit and the number of completed questionnaires indicated at the top of this table are the result of mailed questionnaires being returned by students after they had been selected as part of the nonrespondent sample.

Implications for Future Studies

Mailing Costs. In conducting large-scale follow-up studies such as Project TALENT, it is always necessary to be cost conscious. When 100,000 items are mailed, a decision which increases the cost per addressee only 2 cents will increase the total mailing cost $2,000. Therefore, it is important to know how much this additional $2,000 will increase the response rate, since our concern is to achieve the maximum number of responses for the least amount of money. In this section of the chapter we will consider two kinds of cost: direct expenses in mailing the questionnaires and direct expenses in receiving and processing returned questionnaires.

The costs in sending a questionnaire include the questionnaire printing, label preparation, sorting and mailing charges, and the actual postage. In a mailing wave which includes the mailing of the questionnaire, a newspaper, and two reminder cards, the costs are approximately 10 cents per person. In a wave involving only the questionnaire and one reminder card the costs are approximately 6 cents per person. An example of a cost consideration in mailing is whether to include in a second or subsequent wave those questionnaires which were returned with no forwarding address. At one time it was thought that these names would be included in subsequent waves because a different postal clerk might check more carefully for a forwarding address. Studies of this problem have indicated that it might be reasonable to try twice, but beyond that the cost per new address exceeds the cost of using other methods to obtain better addresses, such as Regional Coordinators. Because of our new policy of sending out the newspaper with return requested, the first questionnaire and the newspaper (sent about one week apart) serve as a basis for deciding whether a particular individual should be included in subsequent waves. His name would be deleted if both the questionnaire and the newspaper were "dead ends."

Cost considerations are also involved in deciding how many waves of a questionnaire are economical. For example, when the cost per addressee is 6 cents for a questionnaire and a reminder card and the response to that wave is only 3 per cent, the cost of mailing per respondent is $2.00. Obviously, the point is soon reached where the attempts to increase returns are not worth the additional cost.

The costs of processing a returned questionnaire depend upon whether it was a completed questionnaire returned by the individual or an incomplete questionnaire returned by the post office because of an inadequate address. With the business reply permit, the postage for questionnaires returned by individuals is 7 cents per item. Coding the questionnaires and rostering changes in name and address average about 41 cents per respondent. The punching and verifying of the three cards for each respondent is 25 cents, bringing the cost of processing a completed questionnaire to 73 cents. Although these costs include the clerical workers, they do not include such expenses as staff time for supervision and development of the questionnaire coding keys.

For incomplete questionnaires returned by the post office the postage is 8 cents each. This includes both "dead ends" and those with new forwarding addresses. These latter questionnaires are returned to us rather than forwarded so that we can keep an up-to-date mailing label file. These questionnaires do require some coding to identify the reason for their return and, of course, require rostering if a new address is available or if the address label was garbled in computer preparation. These coding and rostering costs average 17 cents per questionnaire. The punching costs average about 6 cents per returned questionnaire, bringing the total for processing incomplete questionnaires to approximately 31 cents each.

Some of the considerations in reducing return costs include the postage itself, which at first seems relatively fixed. One consideration is whether to use a live stamp which is only 5 cents or a reply permit at 7 cents. When 100,000 questionnaires are mailed with a 5-cent stamp for return, this is an initial investment of $5,000 regardless of the percentage returned. If the return is more than 70 per cent, you have, of course, saved some money. If the return is less than 70 per cent, you have spent more to have your questionnaires returned with a live stamp than with a permit. Of course, there is some evidence that a live stamp for a return does slightly increase the response rate, but the costs of using this stamp would be expected to offset the advantages of doing so, especially in view of our current response rate.

Another way of reducing follow-up costs is to have as much of the questionnaire precoded as possible. Of course, the coding operation does include scanning of all items, whether or not they were precoded, to make sure that they can be easily keypunched. The only items that we spend considerable time coding are the college attended, the job held, and the career planned. These codes are sufficiently detailed to allow us to identify particular colleges and very specific occupations. The alternative of providing lists of the thousands of colleges and occupations so that the individual could check his own would be rather impractical.

We are now considering the possibility of reducing punching costs by converting to methods of optically scanning the coded questionnaire. In the past this was impossible because of the problems of mechanically processing a questionnaire that has been folded or crumpled. Today, however, economically feasible devices are available which can scan questionnaires of this type.

By combining all of these costs, we learn that Project TALENT spends about 60 cents per person to conduct a mailed follow-up study of approximately 100,000 young people. This includes the mailing of four waves of the questionnaire with suitable reminder cards following each wave and the processing of all returned questionnaires (with a 40 to 50 per cent return). Although our cost of 60 cents per person is quite reasonable when compared with the costs of the other follow-up studies, we are still trying to lower our costs without jeopardizing response rates. The money saved could then be spent on mailing innovations which would possibly improve response rates.

Field Survey Costs. As indicated in Table 2-2, the overall cost per nonrespondent was approximately $7.00. However, if staff time were included for each of the first three surveys, instead of just the expenses of the schools, Coordinators, and Retail Credit, the costs of these surveys would be appreciably higher. For example, at least 2,000 persons involved in the tenth-grade special survey returned an expense voucher to this office. Often the cost of processing this voucher exceeded the expense itself.

Of the first three follow-up studies in which schools, Regional Coordinators, and Retail Credit participated, the tenth-grade survey seems to have been the most efficient and economical. The Regional Coordinators were paid an initial honorarium based on the number of questionnaires assigned. An additional honorarium was given for each completed questionnaire. School personnel were also given a nominal honorarium for each questionnaire they successfully completed. All of the cases not completed by either the schools or Coordinators were then sent to Retail Credit. Their costs in the tenth-grade survey were much lower than in the two previous studies because the investigators were instructed to make local phone calls wherever possible, rather than attempting personal interviews. If the individual was extremely difficult to locate, the investigator was permitted to interview parents or close relatives.

The ninth-grade special survey was carried out entirely by Retail Credit. The cost per nonrespondent located in this study was $9.66. The response rate, however, was only 73 per cent.

Based on both cost considerations and response rates from all four special surveys, the most reasonable procedure for locating nonrespondents now seems to be that of having Regional Coordinators locate the easy-to-find cases and then assigning the difficult ones to Retail Credit. There is some indication that this method would reduce the expenses of the Regional Coordinators so that additional funds could be allotted to Retail Credit for locating hard-to-find individuals.

Maintaining the Sample

The major problem which we faced in these follow-up studies was, of course, keeping track of the sample. In addition to the usual difficulties in reaching young people at home, work, or school, there were certain problem areas with an unusually large proportion of nonrespondents. One such area was Pensacola, Florida. Children of many

Navy personnel stationed there in 1960 had since moved leaving no forwarding address. Another problem region was a large midwestern city where Retail Credit investigators learned that the area served by one of our participating high schools had been destroyed when a new throughway was built. We had difficulty, too, in keeping track of the new names of young women who had married since 1960. Since these problems will become increasingly serious with each successive year, new methods must be found for maintaining current names and addresses.

One method now being tried is to distribute the Project TALENT newspaper each year. The purpose of the newspaper is fourfold: (1) to keep the students interested in Project TALENT since their cooperation is essential to the success of the follow-up surveys, (2) to inform them of some of the results of their efforts, (3) to remind those currently receiving the questionnaires to complete them, and (4) to maintain an up-to-date mailing file. By sending the newspaper with return requested to the entire sample each year, individual changes of address are kept current since undelivered newspapers are returned by the post office with new forwarding addresses wherever possible. Because the post office maintains forwarding addresses for only a two-year period, it is advisable to send the paper yearly to all participants.

Experimentation

Although we have varied the follow-up procedures from time to time depending upon our budget and previous experience, it seems desirable to do more systematic experimentation on the follow-up process itself. This experimentation would involve randomly assigning addressees to different follow-up procedures. Then, for example, we could compare a subsample receiving a reminder card with a group not receiving one. Through comparisons of this sort, the most effective follow-up procedures could be determined. It will be necessary to be cautious in this area, however, because we certainly would not want this experimentation to invalidate the main purpose of the follow-up studies.

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Chapter 3

Responses to the One-Year Follow-up Questionnaires

Janet Combs

The American High-School Student (Flanagan, et al., 1964) reported the abilities, interests, plans, and activities of high-school students as determined by the 1960 Project TALENT tests. The purpose of this chapter is to describe the activities of young people approximately one year after high school--the schools they attended, the jobs they held, the careers they planned, the other choices they had made--as determined by the one-year follow-up studies. Although the post-high-school activities of the twelfth- and eleventh-grade classes of 1960 have already been reported in The American High School Student and the Report of the Eleventh-Grade Follow-up Study (Flanagan, et al., 1965), respectively, the first section of this chapter will describe the activities of all four classes tested in 1960. No attempt will be made here to relate these activities to data from the 1960 battery of tests. Subsequent chapters of this report, however, will relate follow-up information such as college courses and career plans to information collected from the original tests. In this way the process of choosing a career can be better understood. This is a primary goal of Project TALENT. The census data reported in this chapter are only a by-product of the research necessary to attain this goal.

The number of young men and women for whom follow-up data are now available on computer tapes is shown in Table 3-1. This table presents both the young people who responded to the mailed questionnaire and the sample of nonrespondents in the special follow-up study.[1] Chapter 2 has already described how data were collected from these two groups. The sample sizes reported in Table 3-1 are generally less than the numbers reported in Tables 2-1 and 2-2. This is because these tables include young people not in the probability sample (about 10 per cent of the total Project TALENT sample). Chapter 3, however, reports results based only on probability sample cases. Problems of missing data have also reduced the number of usable responses.

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[1] The responses of the young people who completed the mailed questionnaire can be found in Appendix B. This additional census information may especially interest researchers planning to conduct studies using Project TALENT data.

Table 3-1

Number of Young People Included in Chapter 3 Tabulations

	Males	Females
Grade 9 (Class of 1963)	22,311	24,661
Grade 10 (Class of 1962)	20,607	22,012
Grade 11 (Class of 1961)	21,669	24,449
Grade 12 (Class of 1960)	22,141	27,329

Because these young people are from a probability sample of the entire high-school population in the spring of 1960, proper weighting and combining information about their activities one year after high school give us estimates of the percentages of the 1960 national population of students in grades 9 through 12 engaging in various post-high-school activities. These estimates are referred to as weighted percentages throughout this chapter. Table 3-2 shows the number of young men and women for whom our sample provides estimates:

Table 3-2

National Population Estimates of High-School Students--Academic Year 1959-1960[a]

	Number in Grade		Number of High-School Graduates from Grade	
	Males	Females	Males	Females
Grade 9	1,377,000	1,366,000	1,125,000	1,145,000
Grade 10	1,266,000	1,256,000	1,040,000	1,080,000
Grade 11	1,133,000	1,174,000	1,020,000	1,060,000
Grade 12	964,000	1,019,000	945,000	1,000,000

[a] Includes students enrolled in all full-time public secondary day schools and nonpublic secondary schools in the United States. Estimates available from other sources (e.g., United States Office of Education and Bureau of Census) agree with these figures and with each other within a 5 per cent error of estimate.

By applying a given percentage to these population values, it will often be possible to estimate the approximate number of young people represented by that percentage.

Even though all estimates will be given in weighted percentages, there are still three problems in trying to compare the post-high-school activities of the four classes tested in 1960:

(1) The composition of the classes was different. Of the twelfth-grade class, for example, 98 per cent completed high school, while only 83 per cent of the ninth graders received a high-school diploma three years later. This grade 9 dropout estimate is higher than the figure generally reported. One possible reason for this is the moderate (73 per cent) completion rate of the special follow-up of nonrespondents for that grade. (Table 3-3).

(2) The follow-up questionnaires were mailed to the four classes at different seasons of the year and at different lengths of time after high school. The twelfth graders (Class of 1960) were first sent questionnaires in June 1961; the eleventh graders (Class of 1961) in May 1962; the tenth graders (Class of 1962) in December 1963; the ninth graders (Class of 1963) in August 1964.

(3) Questions, alternatives, and coding procedures varied from class to class. Items included in one questionnaire were often improved in the next study, while new questions were added and others deleted. The number of alternatives to such questions as "Why did you drop out of college?" and "In which area do you expect to major in college?" was increased to obtain more detail. Coding procedures were also improved from class to class. In the eleventh- and twelfth-grade studies, for example, the alternatives "no further schooling" and "no response" to the question about further education were coded similarly. In the processing of questionnaires from the other two grades, however, they were assigned different codes.

The first of these problems has been solved by including in the analyses presented in the first section of this chapter only high-school graduates, unless otherwise indicated. There was one exception, however. Because only 2 per cent of the twelfth-grade class of 1960 did not graduate,

Table 3-3

Did You Graduate from High School?

(Weighted Percentages Based on Entire Follow-up Sample)

Grade 12

	Males	Females	All
Yes	97.5	98.3	97.9
No	2.5	1.7	2.1
Total	100.0	100.0	100.0

Grade 11

	Males	Females	All
Yes	90.5	92.5	91.4
No, still in school	1.1	0.4	0.8
No, dropped out	8.4	7.1	7.8
Total	100.0	100.0	100.0

Grade 10

	Males	Females	All
Yes	82.3	85.8	84.1
No, still in school	2.1	1.3	1.7
No, dropped out	15.6	12.9	14.2
Total	100.0	100.0	100.0

Grade 9

	Males	Females	All
Yes	81.6	83.8	82.8
No, still in school	1.9	0.8	1.3
No, dropped out	16.5	15.4	15.9
Total	100.0	100.0	100.0

all twelfth graders were included in the analyses. The other two problems cannot be solved; they can only be pointed out so that the reader will be cautious in making class comparisons.

The second section of this chapter will show the bias in the sample of young people who completed a mailed questionnaire by comparing their post-high-school activities with those of a sample of nonrespondents. The comparisons presented in this section of the chapter will show that the respondents to the mailed questionnaire were indeed a biased group upon which Project TALENT was wise not to base its estimates of the activities of the nation's young people. The differences between respondents and nonrespondents will be further discussed in Appendix C using data from the 1960 battery of tests.

Post-High-School Activities

Education after High School.

The percentages of young people who enrolled in various types of schools after high school are indicated in Table 3-4. Of the twelfth graders of 1960, for example, 57 per cent continued their education. The greatest percentages of young men and women entered four-year (32 per cent) and junior or community colleges (8 per cent). Six per cent of the young men attended an Armed Forces enlisted man's school, while 3 per cent were students at a trade or apprentice school, 2 per cent at a technical institute, and 2 per cent at a business school. Of the young women, 8 per cent enrolled in a secretarial or business school, 4 per cent in a three-year school of nursing, and 3 per cent in a trade or apprentice school.

Fifty-nine per cent of the eleventh-grade class of 1960 also continued their education after high school. Forty-one per cent of the eleventh graders enrolled in college, 33 per cent in a four-year school, and 8 per cent in a junior or community college. Of the young men, 6 per cent studied at an Armed Forces school, 3 per cent at a technical institute, and 2 per cent at a trade school. Six per cent of the young women attended a secretarial school; 4 per cent, a three-year school of nursing; 3 per cent, a trade school.

Of the tenth-grade class, 68 per cent enrolled in some type of school

Table 3-4

Education after High School?

(Percentages Based on Weighted Frequencies
of High-School Graduates)

	Grade 12 (Class of 1960)			Grade 11 (Class of 1961)		
	Males	Females	All	Males	Females	All
College offering bachelor's degree or higher	36.5	26.9	31.6	37.3	29.0	33.1
Junior or community college	9.0	6.0	7.6	8.2	7.1	7.6
Technical institute	2.3	0.8	1.5	2.8	0.7	1.8
School of nursing (3-year)	0.0	3.7	1.9	0.0	3.5	1.8
School of practical nursing	0.1	0.5	0.3	0.1	0.7	0.4
Secretarial or business school	2.0	8.2	5.1	1.1	6.4	3.8
Trade or apprentice school	3.4	3.2	3.3	2.2	2.6	2.4
Armed Forces enlisted man's school	6.4	0.3	3.3	6.4	0.2	3.2
Other school	1.8	2.8	2.3	4.3	5.3	4.8
No school or no response to question	38.5	47.6	43.1	37.6	44.5	41.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3-4 (cont.)

Education after High School?

(Percentages Based on Weighted Frequencies
of High-School Graduates)

	Grade 10 (Class of 1962)			Grade 9 (Class of 1963)		
	Males	Females	All	Males	Females	All
College offering bachelor's degree or higher	41.9	33.3	37.5	40.5	34.9	37.6
Junior or community college	10.5	7.4	8.9	11.9	9.4	10.7
Technical institute	4.1	1.3	2.7	3.1	1.2	2.2
School of nursing (3-year)	0.0	3.1	1.6	0.0	2.8	1.4
School of practical nursing	0.0	1.5	0.7	0.0	1.4	0.7
Secretarial or business school	1.6	8.7	5.2	1.4	8.2	4.8
Trade or apprentice school	4.5	4.7	4.6	3.6	3.9	3.8
Armed Forces enlisted man's school	8.4	0.5	4.4	7.9	0.2	4.1
Other school	2.1	2.4	2.3	2.2	3.5	2.8
No school or no response to question	26.9	37.1	32.1	29.4	34.5	31.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

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following high-school graduation. Thirty-eight per cent of the 1960 tenth graders went to a four-year college, 9 per cent to a junior or community college. Eight per cent of the young men from grade 10 were studying at an Armed Forces school and 4 per cent at a trade school. Secretarial schools were attended by 9 per cent of the young women from this class, trade schools by 5 per cent, and three-year schools of nursing by 3 per cent.

Sixty-eight per cent of the young people from the class tested in ninth grade continued their education after completing high school. Thirty-eight per cent entered a four-year college, while 11 per cent attended a junior or community college. Of the young men, 8 per cent enrolled in an Armed Forces school, 4 per cent in a trade school, and 3 per cent in a technical institute. Eight per cent of the young women from this class attended a secretarial school, while 4 per cent were students at a trade school.

College Major. Table 3-5 shows the fields in which students who had completed one year at a four-year, junior, or community college intended to major. From the twelfth-grade class, 21 per cent of the young men planned to major in business, 17 per cent in the natural sciences (mathematics, physical sciences, biological sciences), and 16 per cent in engineering. The greatest percentages of young women from this class expected to be education (24 per cent), business (14 per cent), or English majors (8 per cent).

Business (22 per cent), engineering (17 per cent), and the natural sciences (17 per cent) were also the majors planned most often by the young men from the eleventh-grade class. The young women from this grade, too, were most likely to choose education (28 per cent), business (13 per cent), or English (8 per cent) as their field.

From the tenth-grade class, 20 per cent of the young men intended to major in business, 17 per cent in the natural sciences, 15 per cent in engineering, and 14 per cent in the social sciences. Of the young women from this class, 26 per cent expected to choose education; 12 per cent, business; 12 per cent, the social sciences. The increases in the percentages of both males and females planning to major in this latter area were probably due to revised coding procedures whereby more school subjects were included in this field, rather than being included in "Other."

Table 3-5

College Major?

(Percentages Based on Weighted Frequencies
of Students Who Entered Four-Year,
Junior, or Community Colleges after High School)

	Grade 12			Grade 11		
	Males	Females	All	Males	Females	All
Mathematics	5.4	3.1	4.4	4.5	2.9	3.8
Physical sciences	6.0	1.8	4.2	6.2	1.1	3.8
Biological sciences	5.4	5.2	5.3	6.5	4.1	5.4
Social sciences	7.6	7.2	7.4	7.6	6.0	6.9
English, literature	4.2	7.8	5.7	3.1	8.4	5.5
Foreign languages	0.8	3.5	1.9	0.7	3.9	2.2
Fine arts	1.5	3.9	2.5	1.6	3.8	2.6
Music	1.3	2.8	2.0	1.4	2.6	1.9
Psychology	2.1	3.7	2.8	2.8	3.3	3.1
Philosophy	0.7	0.2	0.5	0.8	0.4	0.6
Religion	0.9	1.1	1.0	1.6	0.4	1.0
Education	5.2	23.6	13.0	7.5	28.5	17.3
Engineering	16.2	0.2	9.4	16.8	0.1	9.1
Business, commercial	21.2	13.7	18.1	21.8	12.7	17.4
Home economics	0.1	3.7	1.6	0.0	4.7	2.2
Agriculture, forestry	3.5	0.0	2.0	3.1	0.0	1.7
Nursing[a]				0.0	5.8	2.7
Physical education[b]						
Other	17.9	18.5	18.2	14.0	11.3	12.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

[a] Included in "Other" category when twelfth-grade questionnaires were coded.

[b] Included in "Other" category when twelfth-grade and eleventh-grade questionnaires were coded.

Table 3-5 (cont.)

College Major?

(Percentages Based on Weighted Frequencies
of Students Who Entered Four-Year,
Junior, or Community Colleges after High School)

	Grade 10			Grade 9		
	Males	Females	All	Males	Females	All
Mathematics	4.7	3.6	4.2	4.9	3.9	4.5
Physical sciences	5.5	1.4	3.8	5.3	1.2	3.5
Biological sciences	7.1	3.6	5.6	7.9	4.5	6.4
Social sciences	13.6	11.5	12.7	10.9	9.1	10.1
English, literature	3.0	9.6	5.8	3.1	8.8	5.6
Foreign languages	1.0	3.5	2.1	1.1	4.0	2.4
Fine arts	1.7	3.9	2.6	1.3	4.0	2.5
Music	1.9	2.4	2.1	1.1	2.4	1.7
Psychology	3.4	3.8	3.6	2.9	4.1	3.5
Philosophy	1.2	0.2	0.8	1.1	0.2	0.7
Religion	1.5	0.5	1.1	0.6	1.5	1.0
Education	3.6	25.5	12.9	3.9	20.0	11.0
Engineering	14.7	0.4	8.6	15.2	0.2	8.6
Business, commercial	19.9	11.5	16.4	21.3	11.1	16.6
Home economics	0.1	4.1	1.8	0.0	4.5	2.0
Agriculture, forestry	2.8	0.0	1.6	2.7	0.1	1.6
Nursing	0.2	5.4	2.4	0.1	5.5	2.4
Physical education	3.3	2.2	2.8	3.3	2.3	2.9
Other	10.8	6.9	9.1	13.3	12.6	13.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

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Business, the natural sciences, engineering, and the social sciences were also the fields in which most of the young men from the ninth-grade class intended to major. Education and business were again the most common choices of the young women. The natural sciences were selected by 10 per cent of the college women from this class, while 9 per cent chose the social sciences, and 9 per cent, English.

College Dropouts. The percentages of young men and women who dropped out of college after one year and their reasons for doing so are indicated in Table 3-6. Of the college students from the twelfth-grade class of 1960, 22 per cent left school within the first year. The reasons for leaving school given most often by the young men were failure (22 per cent), financial difficulties (17 per cent), and offer of a good job (10 per cent). The greatest percentages of female dropouts left school because they got married (23 per cent), were offered a good job (16 per cent), or had financial difficulties (13 per cent).

Eighteen per cent of the college students from the eleventh-grade class also dropped out of school within one year. Financial difficulties (19 per cent) and failure (17 per cent) were the reasons given most often by the young men who left school. The most common explanations offered by the female dropouts were marriage (21 per cent) and financial difficulties (16 per cent).

Of the young men and women from the tenth-grade class who entered college, over 26 per cent had dropped out by the time of the first follow-up study. However, questionnaires were not mailed to these young people until December 1963, 18 months after high-school graduation. A higher dropout rate would thus be expected for this class. As in the twelfth- and eleventh-grade classes, the young men from grade 10 dropped out mainly because of financial difficulties (21 per cent) and failure (11 per cent), while the greatest percentages of young women left school because they got married (25 per cent), or had financial problems (18 per cent).

Nineteen per cent of the college students from the ninth-grade class of 1960 left school within approximately one year. Again the reasons most often given by the young men were financial difficulties (18 per cent)

Table 3-6

Did You Drop out of College?

(Percentages Based on Weighted Frequencies
of Students Who Entered Four-Year,
Junior, or Community Colleges after High School)

	Grade 12			Grade 11		
	Males	Females	All	Males	Females	All
No	79.2	75.6	77.7	81.7	81.8	81.8
Yes	20.8	24.4	22.3	18.3	18.2	18.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Reasons:						
Offered good job	10.0	15.9	12.8	5.4	9.0	7.0
Homesick	0.3	0.5	0.4	0.1	1.3	0.7
Didn't enjoy social life	0.9	1.1	1.0	0.7	0.8	0.8
Got married	2.8	22.8	12.2	2.0	21.3	10.6
College work boring	2.7	1.4	2.1	6.7	3.0	5.0
Had to study too hard	1.7	0.7	1.3	5.7	2.8	4.4
Afraid of failure	3.1	1.6	2.4	5.2	3.5	4.4
Failed	22.1	6.6	14.9	17.2	6.8	12.5
Disciplinary troubles[a]						
Financial difficulties	16.6	13.4	15.1	18.8	16.2	17.7
Became ill	1.9	6.1	3.8	2.9	4.5	3.6
Family emergency	1.4	1.2	1.3	1.8	3.0	2.3
Other reason	36.5	28.7	32.7	28.2	19.8	24.5
No reason[b]				5.3	8.0	6.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

[a] Included in "Other reason" category when twelfth-grade and eleventh-grade questionnaires were coded.

[b] Included in "Other reason" category when twelfth-grade questionnaires were coded.

Table 3-6 (cont.)

Did You Drop out of College?

(Percentages Based on Weighted Frequencies
of Students Who Entered Four-Year
Junior, or Community Colleges after High School)

	Grade 10			Grade 9		
	Males	Females	All	Males	Females	All
No	75.0	71.7	73.6	79.9	82.7	81.1
Yes	25.0	28.3	26.4	20.1	17.3	18.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Reasons:						
Offered good job	7.0	7.1	7.0	3.8	4.0	3.9
Homesick	0.6	0.8	0.7	1.1	1.9	1.5
Didn't enjoy social life	0.4	0.3	0.4	0.4	0.6	0.5
Got married	4.7	24.9	14.1	1.1	17.6	8.8
College work boring	4.5	2.4	3.5	4.2	5.5	4.8
Had to study too hard	1.2	1.0	1.1	2.9	1.7	2.3
Afraid of failure	5.1	2.3	3.8	7.4	2.3	5.1
Failed	11.0	6.6	9.0	10.9	4.8	8.1
Disciplinary troubles	0.5	0.8	0.6	0.9	0.8	0.9
Financial difficulties	21.4	17.8	19.7	18.0	13.6	16.0
Became ill	2.0	3.6	2.8	6.9	9.4	8.2
Family emergency	2.0	2.3	2.2	2.4	1.5	1.9
Other reason	31.6	24.7	28.3	35.3	31.9	33.4
No reason	8.0	5.4	6.8	4.7	4.4	4.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

and failure (11 per cent), while the young women dropped out because they got married (18 per cent), or had financial problems (14 per cent).

Jobs after High School. Table 3-7 presents the percentages of young men and women, college and noncollege, who held jobs after high school. From the twelfth-grade class of 1960, 35 per cent of the students at four-year, junior, or community colleges were employed, 16 per cent full-time (35 hours per week or more) and 19 per cent part-time. Of the noncollege group, 59 per cent were full-time workers and 10 per cent part-time.

Thirty-seven per cent of the college students from the eleventh-grade class held jobs approximately one year after high-school graduation, 18 per cent full-time and 19 per cent part-time. From this same class, 65 per cent of the noncollege group were full-time employees, while 8 per cent worked less than 35 hours a week.

From the class tested as tenth graders, 20 per cent of the young people in college were working full-time and 14 per cent part-time. Of the noncollege group, 71 per cent held full-time jobs and 5 per cent part-time. The question asked these young people, however, was "Did you have a job as of December 1, 1963." This date was 18 months after their high-school graduation, not one year. These data are, therefore, not comparable to the percentages from the twelfth- and eleventh-grade classes.

The percentages from the ninth-grade class are also not comparable to data from any other class. The item on the questionnaires sent to these young people asked, "Did you have a paid job as of August 1, 1964." Therefore, the percentages of college employees were much higher than in the other classes--57 per cent full-time and 13 per cent part-time--since they included young people with summer jobs. Of the noncollege group from grade 9, 71 per cent held full-time jobs, while 6 per cent were employed part-time.

The percentages of noncollege high-school graduates and high-school dropouts who held jobs (full-time and part-time) are compared in Table 3-8. From both the ninth- and tenth-grade classes, approximately 90 per cent of the young men who graduated from high school and 90 per cent of those who did not graduate were working. Female dropouts, however, were much

Table 3-7

Do You Have a Job?

(Percentages Based on Weighted Frequencies of High-School Graduates)

Grade 12

	College			Noncollege		
	Males	Females	All	Males	Females	All
Yes, full-time	20.1	12.1	16.5	62.6	56.8	59.0
Yes, part-time	19.4	17.9	18.7	12.0	8.0	9.5
No	60.5	70.0	64.8	25.4	35.2	31.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Grade 11

	College			Noncollege		
	Males	Females	All	Males	Females	All
Yes, full-time	21.8	14.6	18.5	74.0	57.6	65.0
Yes, part-time	19.1	18.1	18.6	8.8	7.5	8.1
No	59.1	67.3	62.9	17.1	34.9	26.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Grade 10

	College			Noncollege		
	Males	Females	All	Males	Females	All
Yes, full-time	22.6	16.4	19.8	83.1	61.6	71.2
Yes, part-time	14.5	12.3	13.6	6.2	4.0	4.9
No	62.9	71.3	66.6	10.7	34.4	23.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Grade 9

	College			Noncollege		
	Males	Females	All	Males	Females	All
Yes, full-time	66.2	45.3	56.7	85.8	58.9	71.1
Yes, part-time	11.5	15.6	13.4	4.0	6.9	5.8
No	22.3	39.1	29.9	10.2	34.2	23.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3-8

Do You Have a Job?

(Percentages Based on Weighted Frequencies
of Noncollege High-School Graduates and Dropouts)

Grade 10

	Noncollege High-School Graduates			High-School Dropouts		
	Males	Females	All	Males	Females	All
Yes, full-time	83.1	61.6	71.2	86.5	23.9	58.9
Yes, part-time	6.2	4.0	4.9	3.4	5.6	4.4
No	10.7	34.4	23.9	10.1	70.5	36.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Grade 9

	Noncollege High-School Graduates			High-School Dropouts		
	Males	Females	All	Males	Females	All
Yes, full-time	85.8	58.9	71.1	87.3	28.2	59.8
Yes, part-time	4.0	6.9	5.8	3.0	2.5	2.8
No	10.2	34.2	23.1	9.7	69.3	37.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

less likely than graduates to be employed. For example, only 30 per cent of the young women from grade 10 who left school held jobs compared to 66 per cent of the young women from the same class who completed high school. From the ninth-grade class, 31 per cent of the female dropouts were employed, while 66 per cent of the female high-school graduates not attending college held full- or part-time jobs. The differences in these percentages of job-holders can probably be explained by the differences in the percentages of female graduates and dropouts who were married. These percentages will be discussed later in this chapter.

Full-time Jobs. The full-time jobs (35 hours per week or more) held by noncollege high-school graduates approximately one year after high school are shown in Table 3-9. The occupations included in each of these 13 categories are listed in Table D-1 of Appendix D.

The greatest percentages of young men from grade 12 were employed in protective (23 per cent), unskilled (20 per cent), and clerical or sales occupations (19 per cent). Eighteen per cent were skilled workers and 10 per cent, service workers. Of the young women from this grade, 74 per cent held jobs as clerical or sales workers and 12 per cent as service workers.

From the eleventh-grade class, 24 per cent of the noncollege males were skilled workers and 20 per cent, unskilled. Of the females, 78 per cent held jobs in clerical or sales work, while 13 per cent were employed in service occupations.

Of the young men from the class tested in grade 10, 27 per cent were unskilled workers and 25 per cent, skilled. Smaller percentages of the noncollege males from this grade held jobs as clerical or sales (21 per cent) and service workers (11 per cent). Seventy-two per cent of the grade 10 females were employed as clerical or sales workers and 15 per cent as service workers.

From the ninth-grade class, the greatest percentages of young men held jobs as skilled (27 per cent) and unskilled workers (26 per cent), while 68 per cent of the young women were employed in clerical or sales occupations and 16 per cent in service work.

Table 3-10 shows the full-time jobs (35 hours a week or more) held

Table 3-9

What Is Your Job?[a]

(Percentages Based on Weighted Frequencies
of Noncollege High-School Graduates
Working 35 Hours a Week or More)

	Grade 12		Grade 11	
	Males	Females	Males	Females
1. Health professions	0.4	1.1	0.0	0.5
2. Government, law	0.0	0.2	0.5	0.2
3. Teacher, librarian	0.0	0.2	0.2	0.0
4. Business	3.2	1.6	2.4	2.9
5. Creative, cultural	0.1	0.4	0.5	0.5
6. Scientific, medical technician	2.4	0.6	3.0	0.7
7. Clerical, sales	19.4	74.0	17.4	77.6
8. Protective	22.6	1.1	15.6	0.5
9. Skilled worker	17.9	1.1	23.5	0.6
10. Service worker	10.3	11.6	12.3	12.7
11. Unskilled worker	19.9	7.9	19.7	3.6
12. Outdoors	3.2	0.0	4.2	0.2
13. All other	0.6	0.2	0.7	0.0
Total	100.0	100.0	100.0	100.0

[a] See Table D-1 (Appendix D) for occupations in each category.

Table 3-9 (cont.)

What Is Your Job?

(Percentages Based on Weighted Frequencies
of Noncollege High-School Graduates
Working 35 Hours a Week or More)

		Grade 10		Grade 9	
		Males	Females	Males	Females
1.	Health professions	0.1	0.4	0.0	0.1
2.	Government, law	0.1	0.2	0.1	0.3
3.	Teacher, librarian	0.0	0.1	0.0	0.0
4.	Business	3.2	1.8	2.0	1.4
5.	Creative, cultural	0.4	0.3	0.2	0.1
6.	Scientific, medical technician	4.1	1.8	3.2	3.4
7.	Clerical, sales	21.2	71.9	17.4	67.5
8.	Protective	4.8	0.1	10.4	0.4
9.	Skilled worker	24.6	2.8	27.2	4.2
10.	Service worker	10.9	15.0	9.5	16.5
11.	Unskilled worker	27.2	5.5	26.2	5.3
12.	Outdoors	2.5	0.0	3.2	0.7
13.	All other	0.9	0.1	0.6	0.1
	Total	100.0	100.0	100.0	100.0

Table 3-10

What Is Your Job?

(Percentages Based on Weighted Frequencies
of High-School Dropouts
Working 35 Hours a Week or More)

		Grade 10		Grade 9	
		Males	Females	Males	Females
1.	Health professions	0.1	0.0	0.0	0.0
2.	Government, law	0.0	0.1	0.1	0.1
3.	Teacher, librarian	0.0	0.0	0.0	0.0
4.	Business	3.2	2.3	2.7	0.7
5.	Creative, cultural	0.0	0.0	0.0	0.1
6.	Scientific, medical technician	2.4	0.3	1.2	0.1
7.	Clerical, sales	10.7	34.2	11.9	21.1
8.	Protective	7.3	0.1	11.1	0.1
9.	Skilled worker	29.3	12.9	23.0	11.5
10.	Service worker	13.3	31.1	9.5	39.5
11.	Unskilled worker	31.2	19.0	32.2	26.6
12.	Outdoors	1.5	0.0	6.1	0.1
13.	All other	1.0	0.0	2.2	0.1
	Total	100.0	100.0	100.0	100.0

by young men and women after they had dropped out of high school. Table 3-8 has already indicated that from both the ninth- and tenth-grade classes, the percentage of male dropouts with full-time jobs was the same as the percentage of employed male graduates not attending college. The differences between employed graduates and employed dropouts are evident, however, when Tables 3-9 and 3-10 are compared. Of the young men from the class tested in tenth grade, more dropouts than graduates were protective, skilled, service, and unskilled workers; fewer dropouts than graduates held jobs in clerical or sales work. Of the young men from the ninth-grade class, the dropouts were more likely than the noncollege high-school graduates to hold unskilled, outdoors, and protective jobs. However, fewer male dropouts than graduates were employed in skilled and clerical or sales work. Of the young women from both classes, greater percentages of dropouts than graduates had skilled, service, and unskilled jobs. In contrast, female dropouts were less likely than the young women who completed high school to be clerical or sales workers. In fact, only 34 per cent of the female dropouts from grade 10 held clerical or sales jobs compared to 72 per cent of the graduates. From the class tested in ninth grade, 21 per cent of the young women who dropped out of high school were clerical or sales workers, while 68 per cent of the female graduates held similar jobs.

Career Plans. Table 3-11 presents the career plans of young men and women, college and noncollege. The occupations included in each of these 18 categories are listed in Table D-2 (Appendix D). From the twelfth-grade class, 76 per cent of the college males and 71 per cent of the college females chose professional careers (categories 1-9). Of the noncollege group from this grade, 27 per cent of the males and 16 per cent of the females expected to work in one of the nine professional occupations. Thirty-seven per cent of the young women who did not attend college planned to be housewives, while 9 per cent of the college women made the same choice. The percentages answering "I don't know," ranged from 5 per cent (college females) to 22 per cent (noncollege males).

From the class tested in ninth grade, 79 per cent of the college males and 73 per cent of the college females planned to work in professional

Table 3-11

Career Plans?[e]

(Percentages Based on Weighted Frequencies
of High-School Graduates)

	Grade 12				Grade 9			
	NCM[a]	CM[b]	NCF[c]	CF[d]	NCM	CM	NCF	CF
1. Physical scientist	0.4	4.9	0.0	1.3	0.5	3.6	0.0	1.2
2. Engineer, architect	4.9	14.9	0.0	0.5	3.2	14.7	0.0	0.2
3. Health professions	1.2	6.2	6.7	7.2	0.8	6.1	5.5	6.9
4. Social scientist	1.1	4.7	1.0	6.0	0.7	4.9	0.8	7.3
5. Government, law	0.9	6.4	0.2	1.3	1.1	5.6	0.2	1.2
6. Teacher, librarian	2.0	15.0	2.3	41.8	1.3	15.8	1.5	42.3
7. Business	9.4	18.6	2.3	3.6	9.8	21.4	3.3	4.7
8. Creative, cultural	2.7	3.2	1.8	4.8	1.9	3.2	1.3	4.5
9. Scientific, medical technician	4.0	2.5	1.5	4.2	3.3	3.9	3.1	4.4
10. Clerical, sales	6.3	1.1	30.5	12.2	4.4	1.5	25.2	11.2
11. Protective	6.1	1.9	0.5	0.1	7.1	2.9	0.2	0.0
12. Skilled worker	24.4	4.0	0.5	0.6	27.2	2.9	0.7	0.7
13. Service worker	2.9	0.6	7.5	1.5	3.5	0.1	11.1	2.5
14. Unskilled worker	4.3	0.6	1.1	0.0	7.3	0.3	1.0	0.0
15. Outdoors	6.1	3.6	0.1	0.2	5.4	2.2	0.1	1.0
16. Housewife	0.0	0.0	37.2	9.3	0.5	0.0	41.1	6.2
17. All other	1.2	0.4	0.4	0.3	2.6	0.3	0.7	0.4
18. Don't know	22.1	11.4	6.4	5.1	19.4	10.6	4.2	5.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Noncollege Males [b] College Males [c] Noncollege Females [d] College Females

[e] See Table D-2 (Appendix D) for occupations in each category.

jobs compared to 23 per cent of the noncollege males and 16 per cent of the college females. Forty-one per cent of the young women not attending college expected to be housewives, while 6 per cent of the college females intended to work only in the home. Of the college students, 5 per cent of the females and 11 per cent of the males had no definite career plans compared to 4 per cent of the noncollege females and 20 per cent of the noncollege males.

The careers chosen most often by each of the four groups (males and females, college and noncollege) were the same in both the twelfth- and ninth-grade classes. For example, the noncollege males from each class were most likely to plan careers as businessmen and skilled workers. Of the college males, the greatest percentages from each class expected to work as businessmen, teachers or librarians, and engineers or architects. Careers in clerical or sales work and service work were the most frequent choices of the noncollege females, while the college women were most likely to choose careers as teachers or librarians and clerical or sales workers.

Active Military Duty. Responses to the question "Are you on active duty in the military service?" are shown in Table 3-12. Of the class of 1960, 19 per cent of the young men and 1 per cent of the young women were on active duty. The greatest percentages served in the Air Force, Navy, and Army. An additional 2 per cent of the males had already been in the Armed Forces, 11 per cent expected to be drafted, and 14 per cent intended to enlist.

Sixteen per cent of the young men from the eleventh-grade class and less than 1 per cent of the young women were also serving in the Armed Forces. Of the males, 2 per cent had served at an earlier time, 18 per cent expected to be drafted, and 17 per cent planned to enlist. Ninety-nine per cent of the young women from this class answered, "No, I'm not on active duty and don't expect to be."

From the tenth-grade class, 16 per cent of the young men and 1 per cent of the young women were members of the military service. Two per cent of the males had already served, 18 per cent expected to be drafted, and 14 per cent planned to enlist. From this class, too, 99 per cent of

Table 3-12

Are You on Active Military Duty?

(Percentages Based on Weighted Frequencies
of High-School Graduates)

	Grade 12			Grade 11		
	Males	Females	All	Males	Females	All
Yes, Air Force	6.1	0.3	3.2	4.5	0.0	2.5
Yes, Army	5.2	0.6	2.9	5.5	0.2	3.1
Yes, Navy	5.9	0.2	3.0	5.0	0.1	2.8
Yes, Marine Corps	1.8	0.0	0.9	1.4	0.0	0.8
Yes, Coast Guard	0.4	0.0	0.2	0.1	0.0	0.1
No, but have been	1.8	0.1	0.9	2.4	0.2	1.4
No, but expect to be drafted	11.3	0.0	5.6	18.0	0.0	9.9
No, but expect to enlist	14.3	0.6	7.3	17.4	0.5	9.8
No, and don't expect to be	22.2	91.9	57.4	45.7	99.0	69.6
No, and no response to question	31.0	6.4	18.6			
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3-12 (cont.)

Are You on Active Military Duty?

(Percentages Based on Weighted Frequencies of High-School Graduates)

	Grade 10			Grade 9		
	Males	Females	All	Males	Females	All
Yes, Air Force	4.8	0.3	2.7	3.9	0.2	2.2
Yes, Army	4.7	0.3	2.7	3.8	0.1	2.1
Yes, Navy	5.0	0.0	2.7	4.9	0.2	2.7
Yes, Marine Corps	1.7	0.0	0.9	2.1	0.0	1.1
Yes, Coast Guard	0.2	0.0	0.1	0.2	0.0	0.1
No, but have been	2.1	0.1	1.2	2.1	0.1	1.2
No, but expect to be drafted	17.6	0.0	9.4	15.4	0.0	8.3
No, but expect to enlist	13.5	0.4	7.4	11.7	0.4	6.4
No, and don't expect to be	50.4	98.9	72.9	55.9	99.0	75.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

the young women were not in the service and did not expect to be.

Of the young men from the class tested in grade 9, 15 per cent were on active duty. An additional 2 per cent had been at one time. Fifteen per cent of the males expected to be drafted, while 12 per cent intended to enlist. Of the young women, 99 per cent were not in the Armed Forces, nor did they plan to serve.

The percentages of high-school dropouts serving in the Armed Forces are given in Table 3-13. From the tenth-grade class, 34 per cent of the young men who left school were on active duty compared to 16 per cent of the high-school graduates (Table 3-12). An additional 7 per cent of the dropouts and only 2 per cent of the graduates had once been members of the Armed Forces. Of the male dropouts from grade 9, 30 per cent were on active duty, while only 15 per cent of the male graduates from the ninth-grade class were servicemen. Six per cent of the dropouts from this class had once served compared to 2 per cent of the young men who completed high school. The percentages of young women in the Armed Forces were all below 1 per cent.

Marriage. Table 3-14 shows the percentages of married young men and women from each class tested in 1960. From the twelfth-grade class, 11 per cent of the males and 28 per cent of the females were married. Seven per cent of the young men from grade 11 were also married compared to 19 per cent of the young women. From this same grade the percentages of both noncollege married males (11 per cent) and females (28 per cent) were higher than the percentages of college men (3 per cent) and women (4 per cent) who were married.

Of the tenth-graders of 1960, 25 per cent were married, 32 per cent of the young women and 17 per cent of the young men. These percentages are higher than those from the other classes probably because questionnaires were not mailed to these young people until 18 months after they had graduated from high school. In this class, too, more young people not attending college than college students were married.

From the class tested in grade 9, 11 per cent of the males and 26 per cent of the females were married. Eighteen per cent of the noncollege males and 40 per cent of the noncollege females answered, "Yes, I'm

Table 3-13

Are You on Active Military Duty?

(Percentages Based on Weighted Frequencies of High-School Dropouts)

	Grade 10			Grade 9		
	Males	Females	All	Males	Females	All
Yes, Air Force	5.3	0.0	3.1	4.2	0.0	2.4
Yes, Army	12.2	0.0	7.1	12.6	0.0	7.0
Yes, Navy	10.0	0.0	5.8	9.4	0.0	5.3
Yes, Marine Corps	6.0	0.0	3.5	4.1	0.0	2.3
Yes, Coast Guard	0.0	0.0	0.0	0.1	0.0	0.1
No, but have been	7.3	0.1	4.3	6.5	0.1	3.7
No, but expect to be drafted	17.2	0.0	10.0	12.5	0.0	7.3
No, but expect to enlist	8.1	0.2	4.8	4.1	0.2	2.4
No, and don't expect to be	33.9	99.7	61.4	46.5	99.7	69.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3-14

Are You Married?

(Percentages Based on Weighted Frequencies of High-School Graduates)

		Grade 12				Grade 11		
		Males	Females	All		Males	Females	All
Yes, married in high school	N[a]				N	2.7	4.5	3.7
	C[b]				C	0.5	0.3	0.4
	T[c]				T	1.7	2.9	2.3
Yes, married after high school	N				N	8.2	23.0	16.3
	C				C	2.2	4.1	3.1
	T				T	5.4	15.7	10.6
Yes, no date given	N				N			
	C				C			
	T	11.3	28.0	19.8	T			
No	N				N	89.1	72.5	80.0
	C				C	97.3	95.6	96.5
	T	88.7	72.0	80.2	T	92.9	81.4	87.1

[a] Noncollege [b] College [c] Total

Table 3-14(cont.)

Are You Married?

(Percentages Based on Weighted Frequencies of High-School Graduates)

		Grade 10				Grade 9		
		Males	Females	All		Males	Females	All
Yes, married in high school	N[a]	1.9	4.1	3.2	N	1.6	4.3	3.1
	C[b]	0.6	0.7	0.6	C	0.8	0.1	0.5
	T[c]	1.2	2.7	2.0	T	1.2	2.4	1.8
Yes, married after high school	N	22.0	41.6	33.0	N	16.3	35.9	26.9
	C	10.6	12.5	11.5	C	4.4	9.0	6.5
	T	15.9	29.5	22.7	T	9.9	23.8	16.8
Yes, no date given	N				N			
	C				C			
	T				T			
No	N	76.1	54.3	63.8	N	82.1	59.8	70.0
	C	88.8	86.8	87.9	C	94.8	90.9	93.0
	T	82.9	67.8	75.3	T	88.9	73.8	81.4

[a] Noncollege [b] College [c] Total

married," compared to 5 per cent of the young men attending college and 9 per cent of the college women.

The percentages of married high-school graduates not in college and married high-school dropouts are presented in Table 3-15. Of the young men from the tenth-grade class, 24 per cent of the high-school graduates were married by December 1963 compared to 43 per cent of the dropouts. Forty-six per cent of the female graduates from this class were also married, while 77 per cent of the young women who dropped out answered, "Yes I'm married." Understandably, the greatest difference was between the female graduates and dropouts who were married while in high school. Only 4 per cent of the young women who completed school were married as students compared to 33 per cent of the dropouts.

From the ninth-grade class, 18 per cent of the male graduates and 40 per cent of the young women who completed high school were married by August 1964. Of the dropouts from this class, 39 per cent of the males and 77 per cent of the females answered, "Yes, I'm married."

The Respondent Bias

The nonrespondent surveys were undertaken because the young people who responded to the mailed follow-up questionnaires were thought to be a biased sample of all the young men and women in the nation. This bias had already been shown in other studies. Suchman and McCandless (1940), for example, found that respondents had more education than nonrespondents. After the first mailing, 50 per cent of the college-educated women returned a completed questionnaire compared to only 20 per cent of the young women with a high-school education and 10 per cent of those who finished only grade school.

The nature of the respondent bias was also studied by Reuss (1943). He sent questionnaires to individuals after first obtaining background information from their college records. By comparing the young people who responded and those who did not, several differences were found. First of all, more respondents than nonrespondents ranked in the two highest intelligence levels, while fewer respondents were in the four lowest levels.

Respondents in this study also reported better grades in college than

Table 3-15

Are You Married?

(Percentages Based on Weighted Frequencies)

Grade 10

	Noncollege High-School Graduates			High-School Dropouts		
	Males	Females	All	Males	Females	All
Yes, married in high school	1.9	4.1	3.2	4.5	32.9	17.2
Yes, married after high school	22.0	41.6	33.0	38.8	44.5	41.3
No	76.1	54.3	63.8	56.7	22.6	41.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Grade 9

	Noncollege High-School Graduates			High-School Dropouts		
	Males	Females	All	Males	Females	All
Yes, married in high school	1.6	4.3	3.1	2.8	32.0	16.6
Yes, married after high school	16.3	35.9	26.9	36.1	44.7	40.2
No	82.1	59.8	70.0	61.1	23.3	43.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

nonrespondents. Fifteen per cent of the college students who responded had a "B" average or better, while only 10 per cent of the nonrespondents had the same average. A final comparison by Reuss showed that respondents were more likely than nonrespondents to stay in college. Of the respondents, 56 per cent stayed in school--at least during the first two years--compared to only 32 per cent of the students who did not respond.

In this section of the chapter, the post-high-school activities of respondents and nonrespondents from grades 9 and 12 will be presented. Comparison of these activities will make the nature and extent of the bias in the respondent sample even clearer.

The first comparison (Table 3-16) shows that the respondents were more likely to graduate from high school than those young people who did not return a completed questionnaire. In the class tested as twelfth graders, the percentage of respondents who completed high school (99) was 3 per cent higher than the percentage of nonrespondents who graduated (96). In the ninth-grade class, the difference between these two groups was much greater. Ninety-one per cent of the respondents from this class received a high-school diploma compared to only 74 per cent of the nonrespondents.

A second comparison (Table 3-17) reveals that more respondents than nonrespondents entered a four-year college after high school. In the twelfth-grade class of 1960, for example, twice as many respondents (40 per cent) as nonrespondents (20 per cent) went to a college offering a bachelor's degree. These two groups differed even more in the class tested in ninth grade. About 41 per cent of the respondents from grade 9 were students at a four-year college compared to only 15 per cent of the young people who did not complete a mailed questionnaire.

Respondents were also more likely than nonrespondents to stay in college--at least during the first year (Table 3-18). Of the college students from grade 12, 85 per cent of the respondents were still in college at the end of their freshman year; only 58 per cent of the nonrespondents remained in school. In the ninth-grade class, 87 per cent of the college respondents were still students compared to 72 per cent of the nonrespondents.

Table 3-16

Did You Graduate from High School?

Grade 12

	Regular Questionnaire (Percentages Based on Weighted Frequencies)			Special Questionnaire (Percentages Based on Weighted Frequencies)		
	Males	Females	All	Males	Females	All
Yes	99.0	99.3	99.1	95.8	96.5	96.1
No	1.0	0.7	0.9	4.2	3.5	3.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Grade 9

	Regular Questionnaire (Percentages Based on Weighted Frequencies)			Special Questionnaire (Percentages Based on Weighted Frequencies)		
	Males	Females	All	Males	Females	All
Yes	90.8	91.9	91.4	73.0	74.6	73.7
No	9.2	8.1	8.6	27.0	25.4	26.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3-17

Education after High School?

Grade 12

	Regular Questionnaire (Percentages Based on Weighted Frequencies)			Special Questionnaire (Percentages Based on Weighted Frequencies)		
	Males	Females	All	Males	Females	All
College offering bachelor's degree or higher	46.1	34.4	39.8	24.6	14.0	19.7
Junior or community college	8.8	6.7	7.7	9.2	4.9	7.3

Grade 9

	Regular Questionnaire (Percentages Based on Weighted Frequencies)			Special Questionnaire (Percentages Based on Weighted Frequencies)		
	Males	Females	All	Males	Females	All
College offering bachelor's degree or higher	44.9	37.1	40.8	16.2	14.2	15.3
Junior or community college	12.1	9.3	10.6	5.8	4.4	5.1

Table 3-18

Are You Still in College?

	Regular Questionnaire (Percentages Based on Weighted Frequencies)			Special Questionnaire (Percentages Based on Weighted Frequencies)		
Grade 12						
	Males	Females	All	Males	Females	All
No	14.2	16.6	15.3	35.1	55.4	41.5
Yes	85.8	83.4	84.7	64.9	44.6	58.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
Grade 9						
	Males	Females	All	Males	Females	All
No	14.5	11.4	13.1	28.6	28.0	28.3
Yes	85.5	88.6	86.9	71.4	72.0	71.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

As Tables 3-19 and 3-20 indicate, respondents also differed from nonrespondents in the college majors they intended to choose. Respondents from both the twelfth-grade and the ninth-grade classes were more likely than the nonrespondents to choose the natural sciences (mathematics, physical sciences, biological sciences) as their field. Seventeen per cent of the twelfth graders who returned a completed questionnaire selected this field compared to only 5 per cent of the nonrespondents. Although the difference between the two groups was smaller in the ninth-grade class (15 per cent of respondents compared to 13 per cent of the nonrespondents), the respondents were still more likely than the nonrespondents to be science or math majors. In the field of business the opposite was true. Respondents from both classes were less likely than the nonrespondents to select this field as their major. Of the twelfth-grade respondents, only 15 per cent chose business, while 28 per cent of the nonrespondents made the same choice. In the ninth-grade class, too, fewer respondents (15 per cent) than nonrespondents (21 per cent) majored in business.

Tables 3-21 and 3-22 show that the respondents also made different career plans than the nonrespondents. By combining these 18 occupational categories into five groups (professional, nonprofessional, housewife, all other, and don't know), these differences become even clearer (Tables 3-23 and 3-24). For example, of the young men tested as twelfth graders, more respondents than nonrespondents chose professional careers--37 per cent of the noncollege males and 79 per cent of the college males from the respondent group compared to only 15 per cent of the noncollege males and 70 per cent of the college males who did not complete a regular questionnaire. Young women from the respondent group were also more likely to plan professional careers. Of the respondents, 21 per cent of the noncollege females and 76 per cent of the college females expected to make careers in professional jobs, while only 9 per cent of the noncollege females and 50 per cent of the college females from the nonrespondent group made similar plans.

Another comparison shows that fewer female respondents than nonrespondents from grade 12 planned to be housewives. Of the noncollege group,

Table 3-19

College Major?

Grade 12

	Regular Questionnaire (Percentages Based on Weighted Frequencies)			Special Questionnaire (Percentages Based on Weighted Frequencies)		
	Males	Females	All	Males	Females	All
Mathematics	6.2	3.8	5.1	3.5	0.5	2.5
Physical sciences	7.4	2.0	4.9	2.8	0.9	2.2
Biological sciences	7.6	6.2	7.0	0.3	0.9	0.5
Social sciences	8.0	6.6	7.4	6.7	9.6	7.6
English, literature	3.1	8.8	5.7	6.7	3.7	5.7
Foreign languages	1.1	4.3	2.5	0.3	0.0	0.2
Fine arts	1.9	3.9	2.8	0.6	3.6	1.6
Music	1.4	2.6	1.9	1.2	4.0	2.1
Psychology	2.7	3.9	3.2	0.7	3.3	1.6
Philosophy	0.9	0.3	0.6	0.0	0.0	0.0
Religion	1.1	0.9	1.0	0.4	1.9	0.9
Education	5.4	24.6	14.3	4.7	18.5	9.2
Engineering	17.7	0.2	9.6	12.9	0.0	8.7
Business or commercial	18.4	10.5	14.8	27.8	27.1	27.6
Home economics	0.1	4.7	2.2	0.0	0.0	0.0
Agriculture and forestry	3.6	0.1	2.0	3.2	0.0	2.1
Other	13.4	16.6	15.0	28.2	26.0	27.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3-20

College Major?

Grade 9

	Regular Questionnaire (Percentages Based on Weighted Frequencies)			Special Questionnaire (Percentages Based on Weighted Frequencies)		
	Males	Females	All	Males	Females	All
Mathematics	5.1	4.1	4.6	4.7	3.8	4.3
Physical sciences	6.3	1.5	4.1	3.5	0.5	2.3
Biological sciences	8.4	4.5	6.6	7.2	4.8	6.2
Social studies	13.8	11.1	12.6	5.4	4.5	5.0
English	3.3	9.6	6.2	2.6	7.4	4.6
Foreign languages	1.0	4.5	2.6	1.2	3.1	2.0
Fine arts	1.7	3.7	2.6	0.5	4.7	2.2
Music	1.6	2.5	2.0	0.0	2.1	0.9
Psychology	3.0	4.7	3.8	2.7	2.7	2.7
Philosophy	0.9	0.2	0.6	1.4	0.0	0.8
Religion	0.7	0.5	0.6	0.5	4.1	2.0
Education	3.0	20.7	11.0	6.1	19.7	11.7
Engineering	15.5	0.2	8.5	12.8	0.0	7.6
Business and commerce	18.8	9.9	14.8	26.9	13.0	21.2
Home economics	0.1	4.8	2.2	0.0	3.8	1.6
Agriculture and forestry	3.3	0.1	1.9	1.3	0.1	0.8
Nursing	0.1	5.2	2.4	0.0	3.6	1.5
Physical education	2.9	2.5	2.7	4.2	1.9	3.3
Other	10.5	9.7	10.2	19.0	20.2	19.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3-21

Career Plans?

Grade 12

		Regular Questionnaire (Percentages Based on Weighted Frequencies)				Special Questionnaire (Percentages Based on Weighted Frequencies)			
		NCM[a]	CM[b]	NCF[c]	CF[d]	NCM	CM	NCF	CF
1.	Physical scientist	0.8	5.5	0.1	1.6	0.0	3.6	0.0	0.0
2.	Engineer, architect	7.2	16.7	0.0	0.3	2.3	10.0	0.0	1.4
3.	Health professions	1.6	6.4	8.7	7.5	0.8	5.7	3.7	6.2
4.	Social scientist	2.1	5.4	1.3	6.4	0.0	2.9	0.7	4.5
5.	Government, law	1.5	6.6	0.3	1.6	0.3	6.0	0.0	0.0
6.	Teacher, librarian	3.3	15.6	3.7	45.7	0.5	13.7	0.2	24.6
7.	Business	12.3	16.7	2.9	3.3	6.0	23.2	1.5	4.8
8.	Creative, cultural	2.9	3.3	2.0	4.8	2.4	2.9	1.5	5.0
9.	Scientific, medical technician	5.2	2.6	1.8	4.4	2.6	2.2	1.0	3.7
10.	Clerical, sales	4.5	1.2	33.2	10.1	8.3	0.9	25.9	21.3
11.	Protective	5.2	2.2	0.4	0.1	7.1	1.0	0.7	0.0
12.	Skilled worker	23.1	2.5	0.6	0.7	26.0	7.8	0.4	0.0
13.	Service worker	2.3	0.3	8.8	1.3	3.7	1.3	5.6	2.3
14.	Unskilled worker	3.5	0.3	0.6	0.0	5.3	1.7	1.9	0.0
15.	Outdoors	6.5	3.4	0.2	0.2	5.5	4.1	0.0	0.0
16.	Housewife	0.0	0.0	29.9	6.8	0.0	0.0	48.2	19.9
17.	All other	1.0	0.5	0.4	0.4	1.5	0.0	0.2	0.0
18.	Don't know	17.0	10.8	5.1	4.8	27.7	13.0	8.5	6.3
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Noncollege Males [b] College Males [c] Noncollege Females [d] College Females

Table 3-22

Career Plans?

Grade 9

		Regular Questionnaire (Percentages Based on Weighted Frequencies)				Special Questionnaire (Percentages Based on Weighted Frequencies)			
		NCM[a]	CM[b]	NCF[c]	CF[d]	NCM	CM	NCF	CF
1.	Physical scientist	0.6	4.6	0.1	1.2	0.5	1.9	0.0	1.1
2.	Engineer, architect	5.7	15.2	0.0	0.3	2.1	12.4	0.0	0.0
3.	Health professions	1.4	7.0	8.4	7.4	0.8	8.4	3.7	4.0
4.	Social scientist	1.5	5.8	1.1	7.9	0.3	3.1	0.7	6.2
5.	Government, law	1.4	7.0	0.3	1.5	1.0	3.0	0.0	0.8
6.	Teacher, librarian	2.7	16.0	3.0	46.0	0.5	15.2	0.7	35.5
7.	Business	12.0	19.1	4.1	3.9	8.6	25.0	2.6	6.5
8.	Creative, cultural	3.4	3.7	2.1	5.3	0.9	2.2	0.6	3.1
9.	Scientific, medical technician	5.5	3.4	3.2	4.4	1.9	4.3	3.0	4.4
10.	Clerical, sales	4.3	1.0	32.1	10.6	4.3	2.5	19.2	11.9
11.	Protective	5.4	2.3	0.4	0.1	8.1	4.0	0.0	0.0
12.	Skilled worker	27.7	2.2	0.8	0.4	26.7	3.2	0.5	1.4
13.	Service worker	2.4	0.2	11.3	1.5	4.2	0.0	10.9	4.4
14.	Unskilled worker	4.2	0.2	0.9	0.0	9.2	0.5	1.1	0.0
15.	Outdoors	5.6	2.4	0.1	0.3	5.2	1.7	0.0	2.4
16.	Housewife	0.0	0.0	27.6	3.9	0.0	0.0	51.8	11.8
17.	All other	1.6	0.4	0.3	0.2	3.2	0.0	1.0	0.9
18.	Don't know	14.6	9.5	4.2	5.1	22.5	12.6	4.2	5.6
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Noncollege Males [b] College Males [c] Noncollege Females [d] College Females

Table 3-23

Career Plans?

Grade 12

	Regular Questionnaire (Percentages Based on Weighted Frequencies)				Special Questionnaire (Percentages Based on Weighted Frequencies)			
	NCM[a]	CM[b]	NCF[c]	CF[d]	NCM	CM	NCF	CF
Professional (categories 1-9)	36.9	78.8	20.8	75.6	14.9	70.2	8.6	50.2
Nonprofessional (categories 10-15)	45.1	9.9	43.8	12.4	55.9	16.8	34.5	23.6
Housewife	0.0	0.0	29.9	6.8	0.0	0.0	48.2	19.9
All other	1.0	0.5	0.4	0.4	1.5	0.0	0.2	0.0
Don't know	17.0	10.8	5.1	4.8	27.7	13.0	8.5	6.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Noncollege Males [b] College Males [c] Noncollege Females [d] College Females

Table 3-24

Career Plans?

Grade 9

	Regular Questionnaire (Percentages Based on Weighted Frequencies)				Special Questionnaire (Percentages Based on Weighted Frequencies)			
	NCM[a]	CM[b]	NCF[c]	CF[d]	NCM	CM	NCF	CF
Professional (categories 1-9)	34.2	81.8	22.3	77.9	16.6	75.5	11.3	61.6
Nonprofessional (categories 10-15)	49.6	8.3	45.6	12.9	57.7	11.9	31.7	20.1
Housewife	0.0	0.0	27.6	3.9	0.0	0.0	51.8	11.8
All other	1.6	0.4	0.3	0.2	3.2	0.0	1.0	0.9
Don't know	14.6	9.5	4.2	5.1	22.5	12.6	4.2	5.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Noncollege Males [b] College Males [c] Noncollege Females [d] College Females

less than 30 per cent of the respondents expected to work only in the home compared to 48 per cent of the nonrespondents. From the college group, 7 per cent of the respondents and 20 per cent of the nonrespondents planned careers as housewives.

Table 3-23 also reveals that respondents were less likely than nonrespondents to answer, "I don't know," to the question about career plans. Although this was true for males and females, college and noncollege, the greatest difference was between the noncollege males who responded and those who did not. Only 17 per cent of these respondents said, "I don't know," compared to 28 per cent of the nonrespondents.

The differences in the career plans of respondents and nonrespondents from grade 9 were similar to these differences between the two twelfth-grade groups, as indicated in Table 3-24.

A final comparison reveals that respondents were less likely than nonrespondents to be married one year after high school (Table 3-25). Of the twelfth graders, only 10 per cent of the respondents compared to 34 per cent of the nonrespondents were married. The greatest difference was between the female respondents and nonrespondents. Fourteen per cent of the young women who answered the mailed questionnaire were married compared to 51 per cent of the nonrespondents. In the ninth-grade class, the respondents were also less likely than the nonrespondents to be married one year after high school. Twenty-one per cent of the females and 8 per cent of the males who completed a regular questionnaire answered, "Yes, I'm married," compared to 50 per cent of the female nonrespondents and 24 per cent of the young men who did not respond.

From these comparisons it is evident that the respondents were quite different from the young people who did not return a mailed questionnaire. They were more likely than the nonrespondents to graduate from high school, to enter a four-year college, and to stay in college during the first year. They were also more likely than the nonrespondents to choose the natural sciences as their major in college, but less likely to select business. Respondents and nonrespondents differed, too, in the careers they planned. Mor respondents than nonrespondents chose professional jobs as careers, while fewer respondents stated, "I have no definite career

Table 3-25

Are You Married?

Grade 12

	Regular Questionnaire (Percentages Based on Weighted Frequencies)			Special Questionnaire (Percentages Based on Weighted Frequencies)		
	Males	Females	All	Males	Females	All
Yes	5.1	14.5	10.2	19.2	50.9	33.9
No	94.9	85.5	89.8	80.8	49.1	66.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Grade 9

	Males	Females	All	Males	Females	All
Yes	7.8	20.7	14.4	23.5	50.1	35.9
No	92.2	79.3	85.6	76.5	49.9	64.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

plans," or expected to be housewives. The young people who completed a regular questionnaire were also less likely than the nonrespondents to be married one year after high school. Additional comparisons of these two groups can be found in Appendix C.

By combining and properly weighting data from both respondents and nonrespondents, Project TALENT has eliminated the nonrespondent bias in the respondent sample. The data presented in the first section of this chapter can, therefore, be regarded as unbiased estimates of the post-high-school activities of the nation's young people. Subsequent chapters of this report will relate several of these activities--jobs held, careers planned, schools attended, and majors chosen--to the abilities, interests, plans, and activities of young people as determined by the 1960 battery of tests. The following chapter will describe the nature of the tests and the methods used to relate test scores to data collected in the follow-up studies.

Implications for Future Studies

Both procedures to be used in future follow-up studies and criterion groups to be related to 1960 data have been suggested by the one-year follow-up studies. Of the procedures suggested, the first is sending questionnaires to each class at the same time of year. This will eliminate some of the problems encountered in the one-year studies. For example, comparisons of the percentages of workers from each of the four classes were difficult since only ninth-grade questionnaires were sent during the summer months when many young people who did not work at any other time held jobs. The second procedure implied is keeping questions, alternatives, and coding procedures as similar as possible. This is not to say that improvements cannot be made from year to year, but the basic data should be kept consistent so that class comparisons will be possible and so that data from all grades can be combined for small groups. The one-year follow-up studies have also provided criterion groups which can be studied using data from the 1960 battery of tests. In subsequent chapters of this report, groups based on various career plans, jobs, college majors, and schools attended will be described in terms of their

1960 scores. However, as this chapter has indicated, there are many other groups which can be described, such as high-school dropouts, members of the Armed Forces, college dropouts, and the unemployed.

Chapter 4

Nature of the TALENT Variables and Methods of the Studies

Paul R. Lohnes

The one-year follow-up questionnaires yielded a great deal of factual information about what young people were doing and thinking in their first year out of high school. The previous chapter has already reported the data collected on their schools, their jobs, their marriages, their ambitions, and their frustrations. Although these facts are intrinsically interesting for the picture they give of youth just out of high school, the primary purpose of the follow-up studies is to relate these new facts to the data already collected from these same people in the original 1960 test battery. In this test battery over 2,000 different test and questionnaire items were administered. The five answer sheets filled out by each subject were scored by an electronic scoring machine which computed over 100 scale scores from each set of answers. Hundreds of interesting questionnaire items were not combined into scale scores, but remain as separate sources of information. To help the reader to understand the relationships between the 1960 data and the follow-up data, the first section of this chapter will define and describe the nature of the original TALENT variables which are the predictors of the post-high-school activities discussed in this report. The second section will describe the research methods used in studies of these activities.

Nature of the TALENT Variables

A book has already been written which reports on the original TALENT variables in detail (Flanagan, et al., 1962). Since the tests and questionnaires were carefully designed to represent the state of the art of educational measurement, both in quality and comprehensiveness, this report on their design is an excellent guide to modern measurement procedures. This section of the chapter will survey the original TALENT measures in the framework of a theoretical organization in order to assist the reader in understanding the logic and the complexity of the measurement set.

The TALENT measurement set derives from a major tradition in the history of American psychology. Although British psychologists have made important contributions to the development of trait theories of personality, the advanced state of theory, knowledge, and measurement of personality traits is primarily due to the work of American psychologists. Educational psychologists have figured prominently in this area and education has been one of the main fields of application. Since the significance of the TALENT variables can be appreciated only in the context of the basic principles of trait theories of personality, a brief review follows.

A trait is an enduring pattern of behaviors which is exhibited by many people, but in varying degrees. Human personality is described as a system of traits, or the overall organization of the enduring patterns of behaviors exhibited by a person. What characterizes a person as an individual, different from every other individual, is not the elements of his personality so much as the unique profile of degrees of strength and weakness of those elements. In this theory the traits, which are the elements of personality common to many people, are developed in different people to different degrees. These degrees of trait strength or weakness are quantifiable and measurable. Thus, a trait profile which characterizes a particular personality can be represented by a set of scores. On first encounter this theory may seem diabolical in its assertion that the profoundest event in the universe, a human personality, can be known as a mere set of numbers. We would refuse to know our friends in such fashion, and should perhaps wish to know even our enemies more humanely. But sciencing is different from other vocations, and deserves to be evaluated more by its fruits than by its methods. It would be impossible to have a science of human behavior without simplifying recorded human histories by means of numerical reduction of the observable regularities.

Psychologists recognize and measure many traits of personality. Some traits are more general in nature and more pervasive in influencing human activities than others. Some traits are definitely more relevant to the educational enterprise than others, either because they set the conditions for what a student can accomplish in a given subject, or because they define patterns of learned behaviors that are the objectives of courses of instruction. Some traits can be measured by paper-and-pencil tests and questionnaires, others cannot. The traits represented in the original TALENT variables were selected for their relevance to the study of education and its long-range consequences, as well as for their paper-and-pencil measurability. While TALENT did not measure all the traits of the adolescent personality known to psychologists, it did come much closer to appraising a complete set of educationally relevant variables than any previous large-scale research had.

Each trait that Project TALENT investigated can be classified as either an ability or a motive. Abilities are "maximum performance variables" which represent the best performances an individual can muster when confronted with various classes of tasks. In an ability test the subject is given a problem or a work requirement and is expected to make his best effort to solve the problem or satisfy the requirement. A comparison of the speed and precision of his performance with those of other people determines the relative degree of his ability. Motives, on the other hand, are "typical performance variables," governing both direction of behavior and intensity, or level of effort. Where an ability conditions what a person can do, a motive determines what he chooses to do. The relative strengths of an individual's motives can be inferred from his answers to questions about his habits, his preferences, his goals and values, and his fears and frustrations. A scale score for a specific motive is obtained by comparing an individual's answers to responses of other people on key questions considered to be indicators of the degree to which the trait is held.

Ability is the generic term for a domain of traits, which can be further classified as general intelligence, aptitudes, and knowledges. General intelligence is a very pervasive trait that influences quickness and quality of responses to all cognitive tasks. This is sometimes called academic aptitude. Since all problems or jobs that require covert symbol manipulation for their solution or completion are cognitive tasks, this is a very broad and important set of tasks indeed. Cognition occurs whenever mental symbol processing mediates responsive behavior. Whenever people use the mental abstractions we call "concepts," they are cognizing. School study assignments almost always define cognitive tasks, so that general intelligence operates to condition almost every school learning activity. While general intelligence has not been used as a predictor in these particular follow-up studies, it is represented in the TALENT test battery by the Academic Aptitude Composite variable, which has been described in The American High School Student (Flanagan, et al., 1964) as follows:

> The measure of academic aptitude includes tests of verbal and numerical facility; verbal, quantitative, and nonverbal-non-quantitative reasoning; and specific information in English and mathematics. It is a highly reliable measure and is likely to predict overall scholastic achievement rather closely.

Since general intelligence has already been heavily researched in educational psychology, it is not one of TALENT's primary objectives to contribute further documentation on the significance of this comprehensive trait. It will, however. be included in future TALENT research.

An aptitude is a performance trait that facilitates speed and precision of response to items from a specific, unique class of relatively simple tasks. The 15 tests in the TALENT battery which can be classified as aptitudes are:

R-211 Memory for Sentences: the ability to memorize simple descriptive statements and recall a missing word when the rest of the sentence is provided sometime later. (16 items)

R-212 Memory for Words: the ability to memorize foreign words corresponding to common English words. (24 items)

R-220 Disguised Words: the ability to become used to "strange" modes of spelling ordinary words, i.e., the puzzling out from context and appearance the meaning of a word which is vaguely reminiscent of a familiar English word. (30 items)

R-240 Word Functions in Sentences: a measure of sensitivity to grammatical structure which does not employ the terminology of grammar; the ability to understand the structure of a sentence and to recognize the function of each word or phrase in the sentence. (24 items)

R-250 Reading Comprehension: the ability to comprehend written materials; the subject reads a passage and then answers questions about it, referring back to the passage as often as he likes. (48 items)

R-260	Creativity: the ability to find ingenious solutions to a variety of practical problems. (20 items)
R-270	Mechanical Reasoning: the ability to visualize the effects of the operation of everyday physical forces (such as gravitation) and basic kinds of mechanisms (for instance, gears, pulleys, wheels, springs, levers). (20 items)
R-281	Visualization in Two Dimensions: the ability to visualize how diagrams would look after being turned around on a flat surface, in contrast with the way they would look after being turned over. (24 items)
R-282	Visualization in Three Dimensions: the ability to visualize how a figure would look after manipulation in three-dimensional space, by folding a flat figure to make a three-dimensional figure. (16 items)
R-290	Abstract Reasoning: the ability to determine a logical relationship or progression among the elements of a complex nonverbal pattern, and to apply this relationship to identify an element that belongs in a specified position in the pattern. (15 items)
F-410	Arithmetic Computation: the ability to add, subtract, multiply, and divide whole numbers quickly and accurately. (72 items)
F-420	Table Reading: the ability to obtain information from tables quickly and accurately. (72 items)
F-430	Clerical Checking: the ability to compare pairs of names to determine quickly and accurately whether they are identical. (74 items)
F-440	Object Inspection: the ability to spot differences in small objects quickly and accurately when comparing them visually. (40 items)
A-500	Preferences: the ability to make a rapid choice of one from each of many adjectival pairs indicating the kind of friend the subject would prefer to have. (166 items)

A knowledge trait is an ability to recall and apply information in a subject-matter area. Knowledges may depend more on specific learnings and less on innate characteristics of the central nervous, afferent, and efferent systems than do aptitudes. However, all classes of abilities must be thought of as compounded from interactions of genetic and environmental determinants. The TALENT knowledge measures fall into three classes: English scales, mathematics scales, and information scales.

There are five English scales in the TALENT battery. They are:

R-231 Spelling: the ability to spell fairly common words. (16 items)

R-232 Capitalization: knowledge of the rules of capitalization and how to apply them. (33 items)

R-233 Punctuation: knowledge of the appropriate use of all standard punctuation marks, with special emphasis on sentences. (27 items)

R-234 English Usage: the ability to recognize which of several ways of expressing something is preferred usage. (25 items)

R-235 Effective Expression: ability to recognize clear, concise, smooth prose expression of an idea. (12 items)

Like the English tests, the three mathematics scales are closely keyed to curriculum objectives. They are:

R-311 Arithmetic Reasoning: the ability to solve arithmetic problems, with no emphasis on computing skill. (16 items)

R-312 Introductory Mathematics: knowledge of elementary algebra, fractions, decimals, per cents, square roots, intuitive geometry, and elementary measurement formulas; topics usually taught up to and including grade 9. (24 items)

R-333 Advanced Mathematics: knowledge of plane geometry, solid geometry, algebra, trigonometry, analytic geometry, and introductory calculus; topics normally taught in grades 10-12 in college preparatory courses. (14 items)

The 37 separate information scales are listed below. These scales measure degree of familiarity with the special languages, outstanding facts, and basic ideas of special fields of endeavor. They do not measure competences in these fields *per se*. Obviously some of these scales are more likely to measure the content of school experiences than others.

R-101 Screening: a test of extremely basic, simple knowledge designed to identify mentally retarded, functional illiterates and uncooperative students. (12 items)

R-102 Vocabulary (21 items)
R-103 Literature (24 items)
R-104 Music (13 items)
R-105 Social Studies (24 items)
R-106 Mathematics (23 items)
R-107 Physical Sciences (18 items)
R-108 Biological Sciences (11 items)
R-109 Scientific Attitude (10 items)
R-110 Aeronautics and Space (10 items)
R-111 Electricity and Electronics (20 items)

R-112 Mechanics (19 items)
R-113 Farming (12 items)
R-114 Home Economics (21 items)
R-115 Sports (14 items)
R-131 Art (12 items)
R-132 Law (9 items)
R-133 Health (9 items)
R-134 Engineering (6 items)
R-135 Architecture (6 items)
R-136 Journalism (3 items)
R-137 Foreign Travel (5 items)
R-138 Military (7 items)
R-139 Accounting (10 items)
R-140 Practical Knowledge (4 items)
R-141 Clerical (3 items)
R-142 Bible (15 items)
R-143 Colors (3 items)
R-144 Etiquette (2 items)
R-145 Hunting (5 items)
R-146 Fishing (5 items)
R-147 Outdoor Activities (other) (9 items)
R-148 Photography (3 items)
R-149 Games (sedentary) (5 items)
R-150 Theater and Ballet (8 items)
R-151 Foods (4 items)
R-152 Miscellaneous (10 items)

In summary, the TALENT battery contains 60 distinct ability measures, of which 15 have been classified as aptitudes and 45 as knowledges. The knowledge trait measures include 5 English scales, 3 mathematics scales, and 37 information scales. Various composites of these scales have been created.

The typical performance traits, or motives, measured in the TALENT battery, have been grouped into three clusters. The first of these is a personality modality which Henry Murray has aptly named "needs." A need is a response set which impels a person toward or away from a class of environmental circumstances or social interactions which is either gratifying or punishing for him. Needs represent the person's fundamental goals and values in living, often uncognized by him, as well as the deeply seated anxieties which plague him. The degree to which students consider the various items from the 150 behavioral adjectives on the Student Activities Index (SAI) as applying to themselves indicates the relative strengths of a number of needs in their personalities. Ten scales in the needs modality have been established:

R-601 Sociability (12 items)
R-602 Social Sensitivity (9 items)
R-603 Impulsiveness (9 items)
R-604 Vigor (7 items)

R-605	Calmness (9 items)
R-606	Tidiness (11 items)
R-607	Culture (10 items)
R-608	Leadership (5 items)
R-609	Self-Confidence (12 items)
R-610	Mature Personality (24 items)

The second cluster of traits in the domain of motives is widely recognized as the modality of interests. An interest is a highly focused, specialized need for a specific, unique class of activities. Two types of interests are vocational interests directed to specific occupations and work activities, and avocational interests directed toward activities outside the world of work. In the TALENT Interest Inventory the student was confronted with a list of 205 occupational titles and names of activities and was required to state his degree of liking for each. From his responses, his degree of interest on 17 scales was inferred for the following areas:

P-701	Physical Science, Engineering, Mathematics (16 items)
P-702	Biological Science, Medicine (8 items)
P-703	Public Service (11 items)
P-704	Literary, Linguistic (16 items)
P-705	Social Service (12 items)
P-706	Artistic (7 items)
P-707	Musical (5 items)
P-708	Sports (8 items)
P-709	Hunting, Fishing (3 items)
P-710	Business Management (14 items)
P-711	Sales (6 items)
P-712	Computation (10 items)
P-713	Office Work (7 items)
P-714	Mechanical, Technical (15 items)
P-715	Skilled Trades (18 items)
P-716	Farming (7 items)
P-717	Labor (10 items)

The third cluster of motive traits is a loosely organized family of behavioral indicators which generally reflect the life styles of the individual. A style is a response set conditioning the manner in which a person typically behaves for a broad class of behaviors. It is the idiosyncrasy in the pattern of behaviors which individualizes performances without influencing the competences or the goals of the person. Some psychologists speak of style factors as expressive traits. Actually, no scales in the modality of style have been extracted from the TALENT data as yet. However, a large pool of almost 400 items in an instrument called the Student Information Blank (SIB) remains virtually unscaled. Although many of these items reflect on the family environment of the student rather than on his personality, most of them can be viewed as potential contributors to motives scales, and quite a few of them may support some style scales. In the interim, while this scaling research is underway, selected items from this SIB pool are being used as predictors in follow-up studies. For example, the expressed post-high-school educational or vocational plans collected in 1960 have been used as predictors of actual post-high-school education or initial job placements.

Thus, the TALENT battery contains 27 distinct motive measures, of which 10 have been classified as needs and 17 as interests, as well as a large pool of SIB items, some of which may be considered indicators of styles. These, with the 60 ability measures, comprise the basic dimensions of the Project TALENT measurement of the adolescent personality.

In addition to these personality measures, Project TALENT has collected much information about the family and school environments of its participants. A specific example of a socioeconomic status variable used as a predictor is P*801. This variable, scaled from nine Student Information Blank questions, is discussed in Appendix E.

How is this vast reservoir of measurement data going to contribute to a scientific understanding of the nature and nurture of human talents? This is where the essential role of the follow-up studies can be explained. The follow-ups are collecting information about the vocational and avocational choices and activities of these half a million subjects, specifically about the memberships and degrees of success within membership groups. The membership and success variables define the criteria for prediction studies using the 1960 trait measurements as predictor variables. In this mode of research, a talent is defined as a syndrome of ability and motive traits oriented towards the performance of a specific vocational or avocational function. Furthermore, talent is the synthesis of personality traits that govern membership and competence in a job, school, or other activities.

Multivariate statistical analyses, as used in the follow-up studies, actually generate operational definitions of talents for specific criteria. These definitions emerge from analysis as discovered linear functions of the measurement traits which maximize the predictability of membership and success criteria. In this sense, methods such as multiple correlation and multiple group discriminant analysis are heuristic scientific methods which discover theoretical entities (the linear functions here defined as talents) in the process of fitting data. These methods, which have become much more feasible since the development of the digital computer, will be described in the following section.

Methods of the Studies

Since the follow-up studies reported in the remaining chapters generally employ a single integrated set of research methods, amounting to a distinctive research strategy, it will be useful to describe the methods before launching into the research reports. The elements of this set of methods are the multivariate analysis of variance, multiple group discriminant analysis, Mahalanobis D^2 analysis, and classification probabilities analysis. They comprise a strategy for studying the predictability of group memberships from a set of trait measurements. The trait measures are the antecedent variables collected in 1960, while the group memberships are the criterion variables collected by the follow-up questionnaires in the period 1961 to 1964. The types of group memberships studied include: (1) post-high-school educational placements (four-year college, junior college, technical or vocational school, no further schooling), (2) four-year colleges (each specific college constituting a group), (3) job categories, and (4) career plans. Thus, all the studies in this report have the common characteristic that the

Figure 4-1

Jane and Kay in an Artistic (I) and Musical (II) Interests Measurement Space

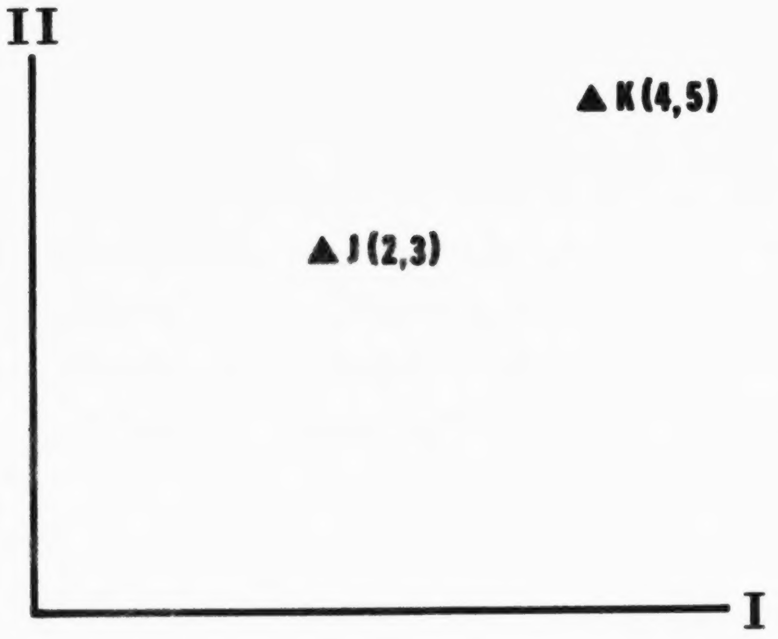
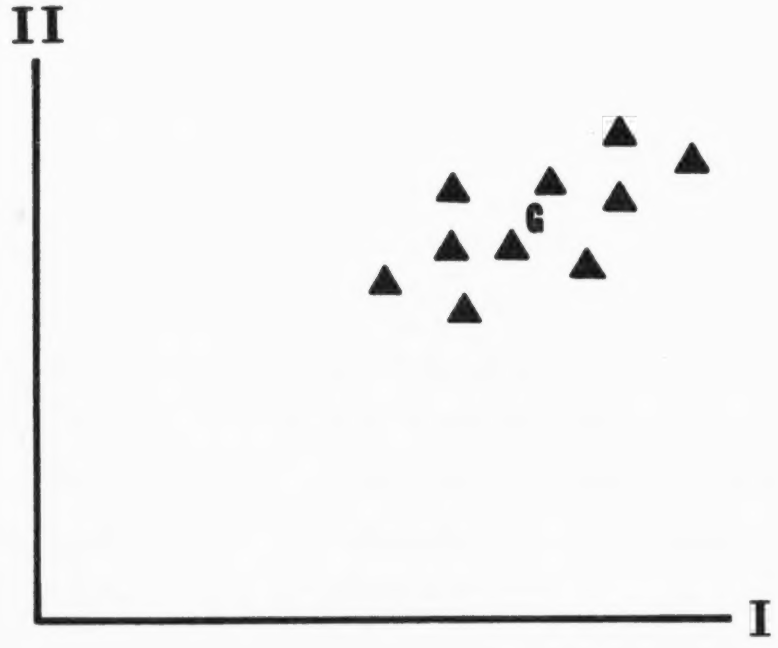


Figure 4-2

A Group of Girls in an Artistic (I) and Musical (II) Interests Measurement Space, with the Letter G at the Group Centroid



subjects have been grouped in some way, and the research question concerns how the grouping can be predicted from the antecedent personality measures. What we have is a strategy for studying *criterion groups in a multivariate measurement space*.

The concept of a measurement space will be new to some readers, and it is so crucial to the methods of these studies that it deserves some exposition. We are all familiar with the fashion in which graph paper represents a two-dimensional space, called a plane, and how reference axes may be drawn on graph paper to supply a coordinate system on the plane, making it possible to plot a point on the plane relative to the reference axes by using its coordinates. In Figure 4-1 the points J (2,3) and K (4,5) are plotted relative to axes I and II. We can understand how a three-dimensional figure might be constructed in the real world by placing a third reference axis at right angles to I and II, and how a point with three coordinates might then be located relative to axes I, II, and III. The concept of a multivariate measurement space transcends the limitations of real-world models, by postulating a k-dimensional coordinate system where k is the number of traits measured and may be any positive integer. The vector of k measurement scores for each subject locates a point representing the position of that subject in the k-dimensional measurement space. If k is 2, as in Figure 4-1, we can visualize these points. For example, in Figure 4-1 axis I might be the Artistic Interest scale, axis II the Musical Interest scale, J (2,3) the position of Jane in the measurement space as indicated by her scale scores, and K (4,5) the position of Kay in the space as indicated by her score of 4 on the artistic scale and her score of 5 on the musical scale. When we have the musical and artistic interest scores for a sample of girls, the plot of the points for all the girls creates a swarm of points in the measurement space. The average score for the group on the musical scale ($\bar{M}_g$) and their average on the artistic scale ($\bar{A}_g$) provide coordinates for a point in the center of the swarm ($\bar{M}_g$,$\bar{A}_g$) which is called the group *centroid*. Figure 4-2 represents a swarm of girls, and their centroid is plotted by the letter *G* in the middle of the swarm. The relative size and shape of the swarm are described in multivariate statistics by a set of numbers called collectively the group *dispersion*.

Imagine now a swarm of points for a sample of boys in the same measurement space with the centroid for boys $(\overline{M}_b,\overline{A}_b)$ plotted by the letter B. Boys generally are lower in musical and artistic interests than girls, so the swarm is centered closer to the axes than is the swarm for girls. Figure 4-3 superimposes the swarm for boys on the plot for girls. Clearly, boys and girls tend to occupy different regions of the measurement space although there is overlap of the swarms.

The strategy for studying criterion groups in a multivariate measurement space begins by collecting measurements for random samples of the criterion populations (e.g., high-school boys and high-school girls). Centroid and dispersion estimates for the samples are computed. One assumption of the strategy is that the populations differ only in their centroids, and all have the same dispersion. That is, all the groups are assumed to have the same size and shape of swarm. Naturally, group sample dispersions differ by chance anyway, but the group sample dispersions are pooled into a best estimate of the common populations dispersion. The first important research question is whether the observed differences in group sample centroids are large enough to warrant the inference of real differences in group population centroids. After all, if all the populations had a common centroid, their sample centroids would differ by chance effects of sampling. The question of the statistical significance of observed differences in group sample centroids is answered by the multivariate analysis of variance. The test statistic produced is an F ratio. A univariate F ratio is also produced for each measurement scale as a test statistic for the question of the statistical significance of the differences among the group sample means for one scale.

Assuming that the centroids differ significantly, the second important research question concerns the directions in the measurement space along which the group differences are greatest. The determination of these directions is the task of multiple group discriminant analysis. The first thing discriminant analysis does is to orient a line in the measurement space along which the differences among the projections of the group centroids are most significant. This line is the first discriminant

Figure 4-3

In an Artistic (I) and Musical (II) Interests Space, a Group of Girls with the Letter G at Their Centroid, and a Group of Boys with the Letter B at Their Centroid

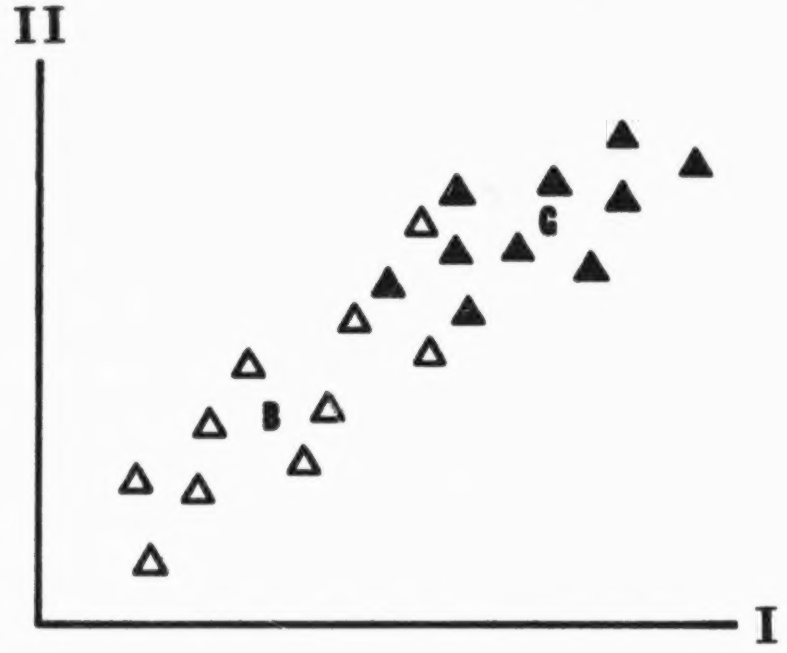
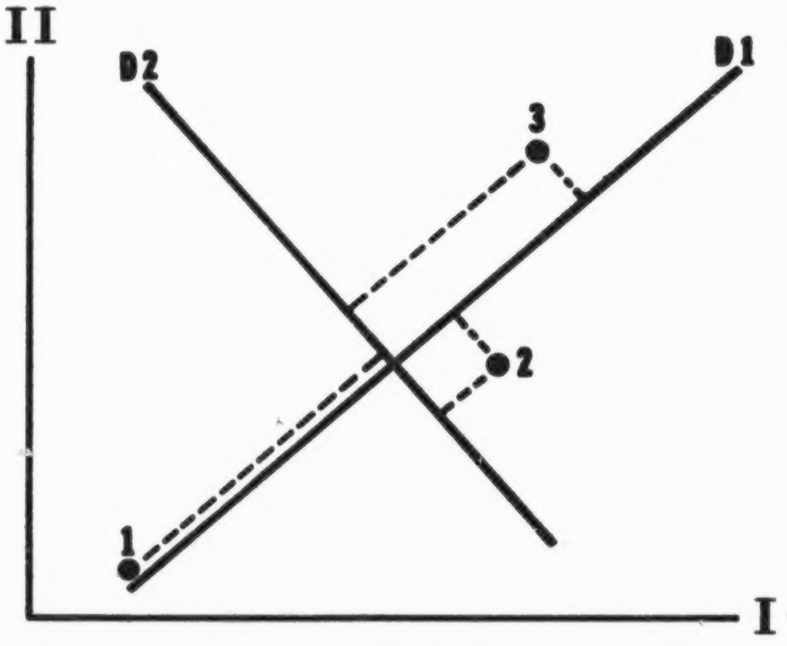


Figure 4-4

Two Discriminant Functions (D1 and D2) Separating Three Groups (Dots are Centroids) in a Two-Dimensional Measurement Space, with Projections of Centroids onto Discriminant Axes



function, and the measurement axes it lies closest to are identified as useful predictors of group membership. Then the analysis orients a second line at right angles to this first one and rotated so that the differences of projections of group centroids on it are again the most significant possible. This is the second discriminant function and is an independent dimension along which there are important differences among the groups. This process is continued until all the independent significant directions for group differences have been described by discriminant functions. Figure 4-4 shows two discriminant functions for separating three groups in a two-dimensional measurement space. Discriminant analysis is especially useful when it reveals that there are only a few important directions of group differences for many groups in a space of many dimensions. The next chapter reports that there are only two directions of differences for six post-high-school educational groups located in a 27-dimensional measurement space (Figures 5-9 and 5-10). Thus the analysis has revealed the existence of two basic dimensions of differences among the six criterion groups. The unwieldy map of the six groups located in a space of 27 dimensions can be replaced by a parsimonious map locating the six groups in a derived two-dimensional discriminant functions space.

Those readers familiar with factor analysis should think of the derived dimensions as factors of the measurement battery which maximize the separation of the groups. The patterns of correlations of the discriminant functions with the original measurements help us to understand the derived factors. Other readers may think of these discriminant factors as hypotheses generated by statistical analysis of how the group memberships of individuals depend on their measurement scores. These discovered factors of measurement traits which make criterion group memberships predictable actually define the talents required for entry into the specified groups, at least insofar as the measured traits cover the possible requirements. In this sense, discriminant analysis yields operational definitions of talents.

When only one or two discriminant factors exhaust the power of a test battery to separate groups, a plot on graph paper of the centroids of the groups in the discriminant-function space reveals which groups are distinctly separated and which groups tend to cluster together. If there are more than two directions of important group differences, a problem arises as to how clusters of groups can be located. This is the research question for which Mahalanobis' D^2 statistic is employed. D^2 is a generalized distance measure for a pair of groups. A single D^2 is meaningless, but when D^2 is computed for every possible pair of groups, comparisons of D^2's become very meaningful. In a table of D^2's, the smallest entries indicate the pairs of groups which are closest together in the measurement space. Any group which has relatively large D^2's with all other groups is an outlying group. Such a table makes it possible to cluster groups which reside near each other in a region of the space into a larger aggregate, constituting a natural family of criterion groups. Through this method it is possible, for example, to discover a family of colleges which place very similar demands on the personalities of students. Families of occupations may also be sought.

The final method involved in this strategy, classification probabilities, helps to answer the question of how good the predictions of group memberships afforded by the discriminant factors are. This method makes it possible to apply the findings of a discriminant analysis to a new random sample of subjects, called a replication sample, and to predict from their known measurement scores their concealed group memberships. Then the predicted membership of each new subject, which is the group for which he has the largest classification probability, is compared with his actual group membership, and he is counted as a prediction "hit" if these are the same and as a "miss" if they aren't. The resulting ratio of hits and missess for all the new subjects is one indication of the prediction payoff of the study. One of the advantages of Project TALENT is that it has enough data to provide replication samples as checks on findings from its research samples.

Taken together these methods comprise an integrated and powerful strategy for studying criterion group differences in a multivariate measurement space, as the following chapters will show. Readers unfamiliar with these methods might be interested in the more detailed accounts of them contained in Chapters 4, 6, and 7 of Cooley and Lohnes (1962).

Chapter 5

Post-High-School Education

Lyle F. Schoenfeldt[1]

The fact that an increasing proportion of each year's high-school graduates are continuing their education is well documented (see Table 3-4). During the four-year period of Project TALENT's one-year follow-up surveys, the percentage of students reporting some further education increased from 57 per cent to 68 per cent. This 11 per cent increment over a four-year period illustrates in a dramatic way the degree to which high-school graduates see the need to acquire additional skills and relevant knowledge necessary to pursue a career.

Within the educational community, emphasis has been on the development of a broader range and greater number of educational alternatives. Until recently, the high-school graduate's choice was pretty much limited to attending a four-year college or finding a job. This has been and is changing. Vocational education has come into its own as a necessary and important vehicle to prepare students for the demands of the world of work. The recent and continuing increases in the strength of United States Armed Forces has resulted in this organization becoming an ever increasing force in the training of high-school graduates. The junior college, long a factor in post-secondary education, has only recently assumed a key role in meeting the need for a greater range of educational alternatives.

The purpose of this chapter is to elaborate on the results presented earlier by Flanagan and Cooley (1965) and more recently by Cooley and Becker (1966). The research described in those previous publications compares Project TALENT students who later entered junior college with those in two other groups: noncollege or four-year college. By means of discriminant analyses, these three groups were contrasted on a number of the variables originally derived from the TALENT battery. It was found that junior college students tend to be more like noncollege students in terms of ability, and more like college students in terms of socioeconomic factors.

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[1] Portions of this chapter are based upon analyses conducted by Dr. Richard Holdeman, formerly with Project TALENT.

As in the earlier studies, the goal of this chapter is to assess differences among groups formed using one item of the one-year follow-up questionnaire dealing with schools attended since high school. Males and females were coded separately on the follow-up item with the males being divided into the following six groups: (1) four-year college, (2) junior college, (3) Armed Forces school, (4) technical institute, (5) trade or apprentice school, and (6) no post-high-school education. Females were classified into: (1) four-year college, (2) three-year school of nursing, (3) junior college, (4) secretarial or business school, (5) trade school, and (6) no post-high-school education. The sixth or no post-high-school education group for both the males and females included students who returned the follow-up questionnaire, but did not respond to Item 33 as well as those who indicated that they did not pursue any course of study after high school. The basic difference between this and the previous study is that the noncollege criterion group is subdivided into four more specific categories, as indicated above.

General Ability and Socioeconomic Differences

Before going into the details of discriminant analyses of the six criterion groups, gross differences on only two variables can be profitably examined. These two variables are C-002, TALENT's general academic aptitude composite, and P*801, a socioeconomic factor based upon nine SIB items (see Appendix E for a description of P*801). Dividing the distributions of these two predictors at their quartiles, it is possible to classify everyone into one of 16 cells depending upon their combination of ability and socioeconomic scores. We can then determine the proportion in each cell who were members of the six different post-high-school criterion groups.

The results for the grade 11 males and females are reported in Tables 5-1 and 5-2. A number of interesting observations can be gleaned

Table 5-1

Percentage of Males in Six Post-High-School Education Groups by Socioeconomic Environment (SEE) and General Academic Ability

(N =17,738;grade 11 males)

First (Lowest) Socioeconomic Quarter

	Ability Quarter			
	1st	2nd	3rd	4th
Four-year college	6	13	25	48
Junior college	4	6	6	13
Technical school	1	3	3	2
Trade school	3	2	2	1
Armed Forces school	8	16	9	9
None	78	60	55	27
	100%	100%	100%	100%

Second Socioeconomic Quarter

	Ability Quarter			
	1st	2nd	3rd	4th
Four-year college	12	15	34	70
Junior college	5	7	11	7
Technical school	4	2	4	2
Trade school	2	8	2	1
Armed Forces school	9	10	11	5
None	68	58	38	15
	100%	100%	100%	100%

Third Socioeconomic Quarter

	Ability Quarter			
	1st	2nd	3rd	4th
Four-year college	13	29	45	73
Junior college	8	9	10	8
Technical school	4	6	2	2
Trade school	4	3	2	--
Armed Forces school	4	8	11	5
None	67	45	30	12
	100%	100%	100%	100%

Fourth (Highest) Socioeconomic Quarter

	Ability Quarter			
	1st	2nd	3rd	4th
Four-year college	26	36	65	87
Junior college	12	16	11	5
Technical school	6	5	2	1
Trade school	3	2	3	--
Armed Forces school	13	5	5	1
None	40	36	14	6
	100%	100%	100%	100%

Table 5-2

Percentage of Females in Six Post-High-School Education Groups by Socioeconomic Environment (SEE) and General Academic Ability

(N =20,368; grade 11 females)

First (Lowest) Socioeconomic Quarter
Ability Quarter

	1st	2nd	3rd	4th
Four-year college	7	8	18	34
Junior college	1	5	8	8
Nursing school	--	1	2	6
Secretarial or business	4	8	8	10
Technical school	3	4	1	1
None	85	74	63	41
	100%	100%	100%	100%

Second Socioeconomic Quarter
Ability Quarter

	1st	2nd	3rd	4th
Four-year college	7	9	23	67
Junior college	6	4	9	8
Nursing school	1	1	11	8
Secretarial or business	6	8	8	3
Technical school	6	5	2	1
None	74	73	47	13
	100%	100%	100%	100%

Third Socioeconomic Quarter
Ability Quarter

	1st	2nd	3rd	4th
Four-year college	5	20	36	67
Junior college	4	6	8	8
Nursing school	1	4	5	8
Secretarial or business	8	15	10	3
Technical school	4	5	1	1
None	78	50	40	13
	100%	100%	100%	100%

Fourth (Highest) Socioeconomic Quarter
Ability Quarter

	1st	2nd	3rd	4th
Four-year college	20	33	55	82
Junior college	17	10	17	5
Nursing school	--	5	2	3
Secretarial or business	9	11	4	2
Technical school	7	2	1	--
None	47	39	21	8
	100%	100%	100%	100%

from those tables. Given a particular socioeconomic and intelligence combination, it is possible to see what proportion of males in that cell are attending various types of educational institutions. For example, in Table 5-1, a large fraction of male students described as being below average on the socioeconomic variable and above average on academic ability entered junior colleges. However, the largest cell proportions for male junior-college entrants were from the highest socioeconomic quarter and the lowest two ability quarters. The pattern is slightly different for the females (Table 5-2).

Table 5-2 indicates that a slightly greater proportion of those entering schools of nursing were below average on the socioeconomic index. Only a very small proportion of the females below average on ability reported that they were enrolled in a nursing curriculum.

Tables 5-1 and 5-2 can be rewritten as expectancy tables. Table 5-3 presents the probability as of 1960 that a grade 11 male would enter a four-year college for each of the 16 ability-socioeconomic cells. These probabilities go from .06 for low socioeconomic and low ability scores to .87 for high socioeconomic and high ability scores. For boys in the top 25 per cent on ability, the probability of college going varies from .48 to .87, depending upon family socioeconomic environment. Table 5-4 summarizes similar probabilities for girls. The major difference between corresponding male and female probabilities is that those for males are generally higher, as expected.

If ability and socioeconomic environment were of equal importance in the determination of which students will later enter a four-year college, the college entrance probability of a student falling in the second ability quarter and the fourth socioeconomic quarter, for example, would be equivalent to the probability for the fourth ability quarter and the second socioeconomic quarter. As can be seen from Tables 5-3 and 5-4, this is not the case. A high socioeconomic score will only partially compensate for a low ability score in predicting which students will enter college. The ability score facilitates college entrance to a considerably greater degree than does socioeconomic level.

Table 5-3

Probability of a Male Entering College

		Socioeconomic Quarter Low 1	2	3	High 4
Ability Quarter	Low 1	.06	.12	.13	.26
	2	.13	.15	.29	.36
	3	.25	.34	.45	.65
	High 4	.48	.70	.73	.87

Table 5-4

Probability of a Female Entering College

		Socioeconomic Quarter Low 1	2	3	High 4
Ability Quarter	Low 1	.07	.07	.05	.20
	2	.08	.09	.20	.33
	3	.18	.23	.36	.55
	High 4	.34	.67	.67	.82

Further Analyses of Group Differences

Although the previous ability-socioeconomic comparisons are useful to get a general picture of these six group differences, there is considerably more information in the TALENT battery regarding post-high-school educational decisions than is contained in just those two variables. Discriminant analysis is a useful procedure for summarizing this information so the reader would not have to pore over hundreds of tables such as those two considered above.

For each sex, five multiple group discriminant analyses were performed. The first four employed selected variables from four major categories, including: (1) 20 information scales, (2) 16 aptitude and ability scores, (3) 27 temperament and interest scales, and (4) 16 Student Information Blank items. The fifth discriminant analysis was to see how well the best variables from the first four analyses worked in separating the six post-high-school education groups.

All five discriminant analyses were done using those students who met the following requirements: (1) in the eleventh grade when tested in 1960, (2) replied to the one-year follow-up questionnaire, and (3) had scores available for all the variables used in a particular discriminant analysis. Furthermore, because the numbers of both males and females in the college and in the no post-high-school education groups were extremely large, the statistics for these groups were based on the scores of a 10 per cent random sample of the students meeting the above three requirements

The exact number of subjects used to represent each of the post-high-school education groups in a particular discriminant analysis is illustrated in Table 5-5. The number varied slightly depending on the set of variables used because of the third requirement that each subject have scores available for all variables.

General Findings. Three general findings should be kept in mind while examining the figures that follow. First, the analysis demonstrated that each of the four sets of variables differentiated among the six post-high-school education groups. As might be expected, some group pairs were more clearly and consistently differentiable than were other pairs.

Table 5-5

Number of Subjects Used to Represent Each Post-High-School Education Group in the Discriminant Analyses

	Discriminant Analysis				
Male Groups	Information Scales	Ability Scales	Temperament Personality Scales	SIB Items	Combined Analysis
Four-year college	310	292	301	295	300
Junior college	299	336	299	285	300
Technical school	302	294	298	292	300
Trade school	303	304	302	293	300
Armed Forces school	292	315	316	293	300
No post-high-school education	287	287	287	287	287
Female Groups					
Four-year college	313	293	304	293	277
Junior college	289	315	308	305	318
School of nursing	301	305	294	278	288
Secretarial or business school	276	282	328	327	320
Trade school	320	312	304	304	303
No post-high-school education	281	281	321	295	317

A second finding of interest was that for each of the five sets of discriminant analyses, the average differentiation of the six female groups was better than that obtained for the six male groups. This finding was based on the fact that the probability associated with multivariate group differences was higher for the males than for females. This was true irrespective of the set of variables used in the analysis. A low probability indicates that groups were well differentiated.

Another result of general interest was the effectiveness of the four sets of variables in differentiating the six groups. For the males, the information variables did the best job of separating the groups. The temperament-interest variables worked best in separating the six female groups. For both sexes, the selected Student Information Blank (SIB) items did the least effective job of separating the six educational groups. Again, this conclusion was based on the probability estimate associated with group differences resulting from using a particular set of variables. If the probability was large when a given set of variables was utilized to discriminate the six groups, it would be concluded that the variables did not effectively differentiate the groups.

Results. The figures that follow summarize the results of the 10 discriminant analyses: four sets of variables (information, ability, personality-interest, and Student Information Blank items) plus selected variables combined in a fifth discriminant analysis, for each sex. Specifically, each figure presents a plot of the six groups in the two-dimensional space formed by the first two discriminant functions. For each analysis, two functions accounted for over 80 per cent, and usually closer to 90 per cent, of the total discriminating power of the original variables. Because of this fact, the picture represented by two functions could not be substantially improved by the consideration of additional functions.

Figures 5-1 through 5-4 show the results of using the four sets of variables to discriminate the six male post-high-school groups. The actual discriminant functions associated with each analysis are in Appendix F. The results of the discriminant analysis using 20 information

Figure 5-1

Centroids of Six Male Groups in the Discriminant Space Formed Using Information Variables

Grade 11

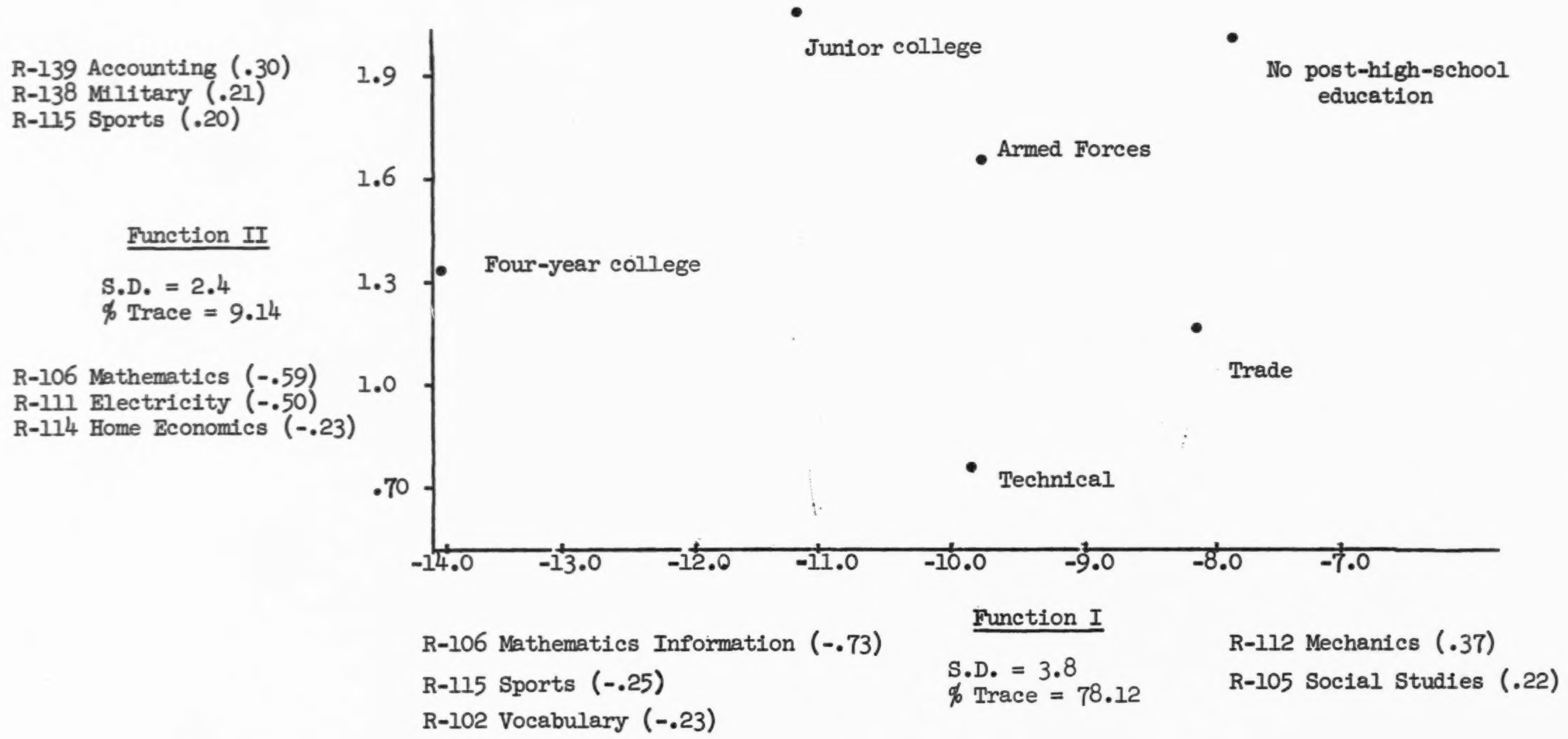


Figure 5-2

Centroids of Six Male Groups in the Discriminant Space Formed Using Ability Variables

Grade 11

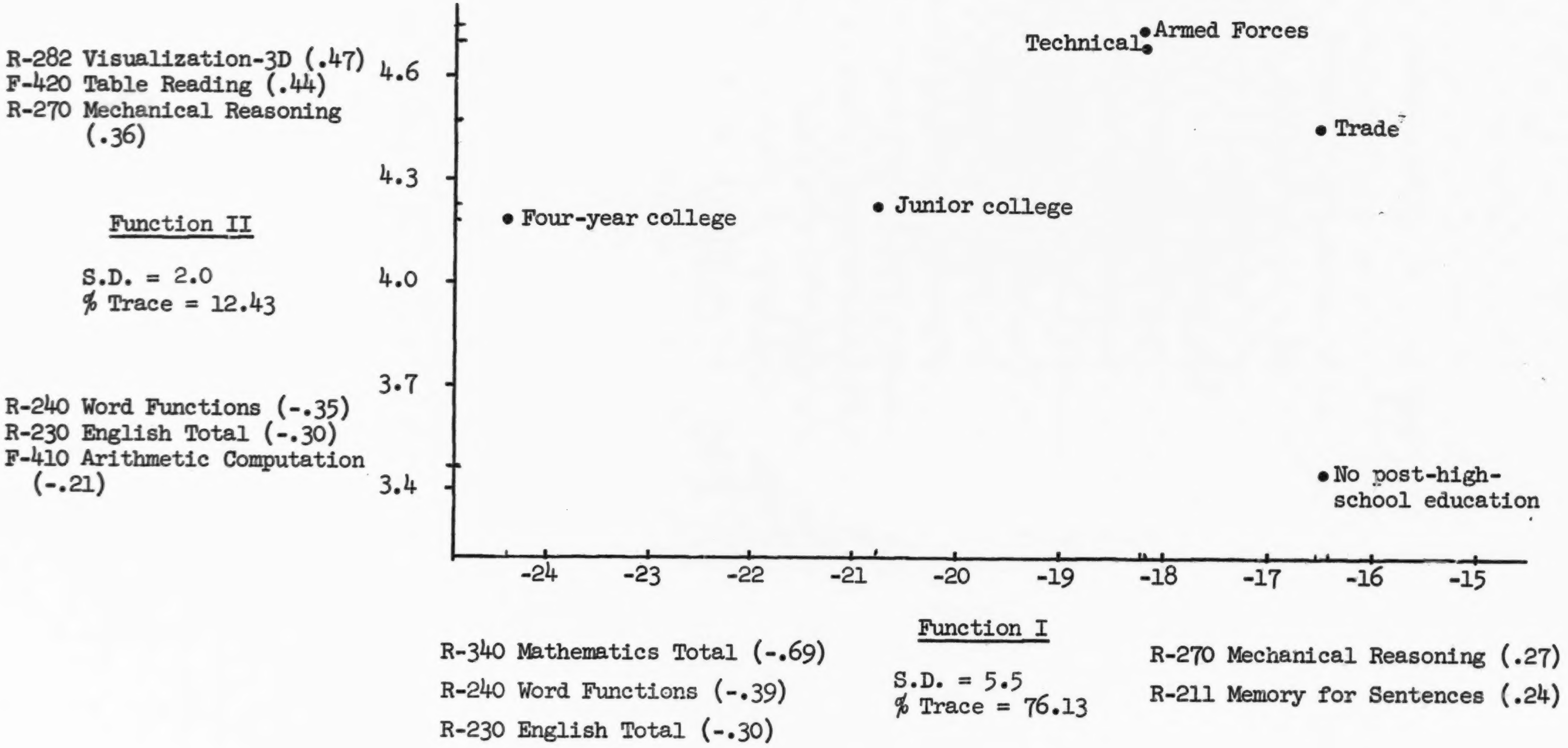


Figure 5-3

Centroids of Six Male Groups in the Discriminant Space Formed Using Temperament-Interest Variables

Grade 11

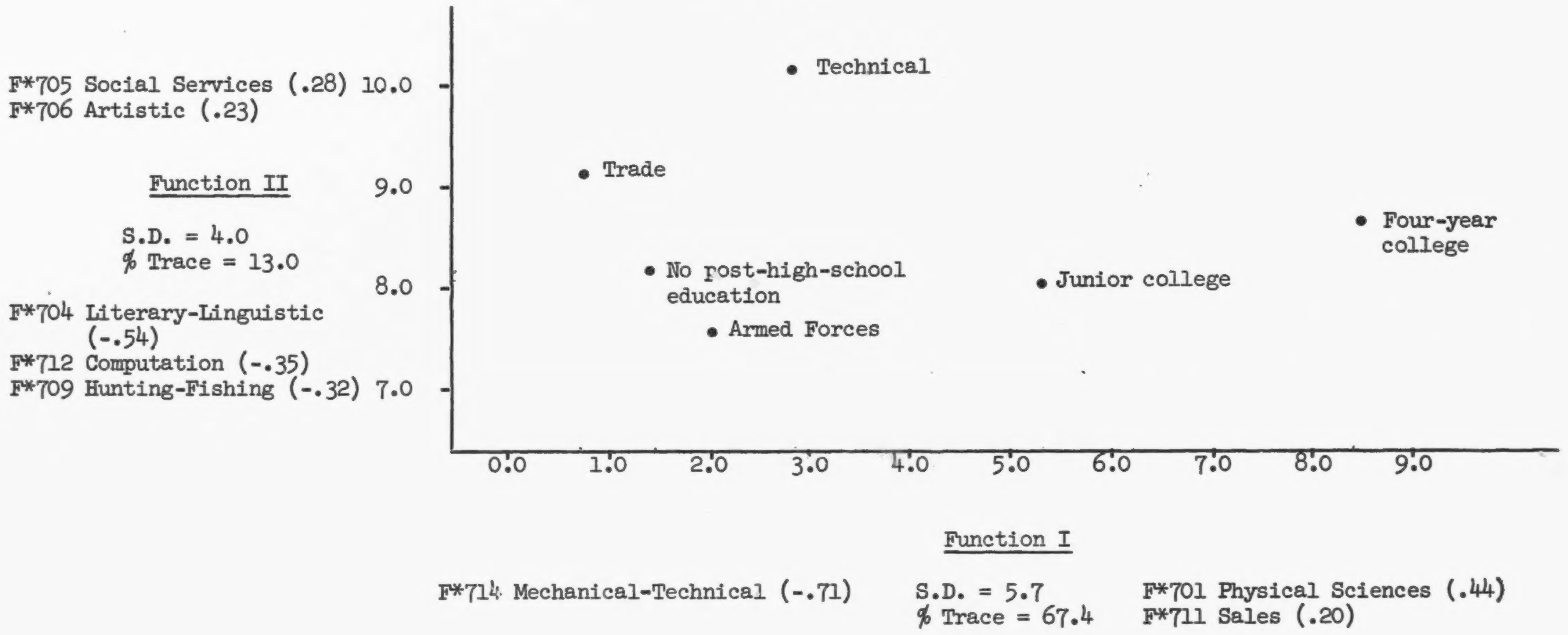
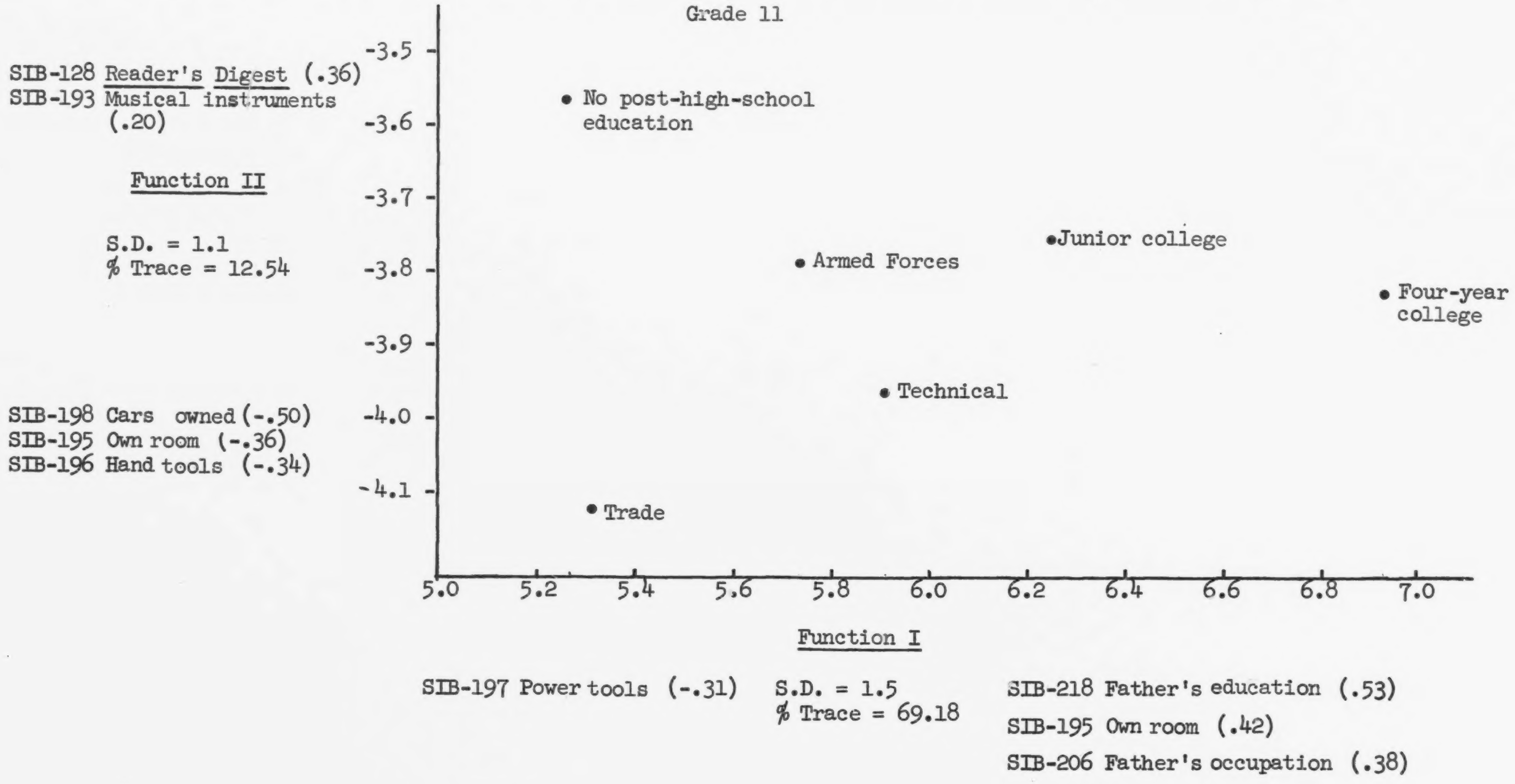


Figure 5-4

Centroids of Six Male Groups in the Discriminant Space Formed Using Student Information Blank Items

Grade 11



scores to differentiate the six male groups are shown in Figure 5-1. On each figure, the horizontal axis represents the first function and the vertical axis the second function. The variables contributing the most to discrimination along each function are listed adjacent to the appropriate axis. In each case the actual weight the variables received is indicated in parenthesis. The Mathematics Information test (R-106) carried the most weight toward separation of the six groups along the first function (the horizontal axis). This variable had a negative weight, which indicates that a high score on this scale contributed to a low score along the first function.

The Mechanics Information scale had the highest positive weight, although its magnitude was only half that contributed by the Mathematics scale. A high score on the Mechanics Information scale resulted in a high score along Function I.

Function I on Figure 5-1 is, in effect, a mathematics information continuum. Although other variables possess negative weights, and a couple of variables obtained positive weights, the magnitude of the weight received by this variable indicates that it is doing most of the work in separating the six groups of Function I. This variable arranged the six educational groups into four points. The Armed Forces and technical groups as well as the no post-high-school education and trade groups had essentially identical scores on this function.

Interestingly, the Mathematics Information scale received the largest weight on the second function, represented by the vertical axis in Figure 5-1. Electrical Information (R-111) was the other variable with a large negative weight, while the Accounting Information scale (R-139) had the largest positive weight. As illustrated in the figure, this second function effectively separated the pairs not differentiated on the first function. The Mathematics and Electricity Information scales pulled the technical and trade group centroids down, while the Accounting and Military Information scales contributed to high scores on the function by the Armed Forces and no post-high-school education groups.

In this and succeeding figures the average within group standard deviation and the per cent of the trace associated with each function are noted adjacent to it. The standard deviation provides an indication of the within group homogeneity. When the centroids or means of a pair of groups are close together and the standard deviation is relatively large, this indicates that there is considerable overlap in the distributions on the function. Such a pair of groups would not be unique.

The trace represents the total discriminating power of the tests utilized in the discriminant function. On Figure 5-1, the first function accounted for 78.12 per cent of the total discriminating power possessed by the 20 information scales. Function II explained another 9.14 per cent of the variance.

Figures 5-2 through 5-4 summarize the discriminant results using other sets of variables to differentiate these six male groups. Although the highlights of each will be verbalized, the level of detail used in the presentation of Figure 5-1 will not be perpetuated. For those wishing the complete tabular results, Appendix F at the end of this report contains the scaled discriminant weights associated with each analysis. The figures represent an almost self-explanatory summary of all salient results of the discriminant analyses.

The results of the discriminant analysis using the 16 ability variables to separate the six male groups are in Figure 5-2. The similarity between these results and those obtained with the information scores is striking. For example, in this analysis the Mathematics Total (R-340) contributed the most weight toward discrimination along the first function. With the information scores, Mathematics Information (R-106) contributed the largest weight. The six groups are arranged in the same pattern on this continuum as on the first function using the information scores. The second function pulled the trade and no post-high-school education groups apart, but did little else. The Armed Forces and technical groups had identical scores on both functions.

The picture obtained when employing 27 interest and temperament scales is presented in Figure 5-3. An interesting aspect of these results was the failure of any of the 10 temperament scales (R-601 through R-610) to contribute to the discrimination. Figure 5-4 shows the group separation obtained using 17 Student Information Blank items. The first function is primarily a measure of socioeconomic background. This confirms the observation made earlier in this chapter that socioeconomic environment is an important determinant of group membership.

The results of the discriminant analyses using the same four sets of variables to separate six female post-high-school education groups are presented in Figures 5-5 through 5-8.

As in the analysis of the male groups, the Math Information scale (R-106) and Math Aptitude score (R-340) contributed great weight to discrimination along the first functions in Figures 5-5 and 5-6. Various other scores contributed to the second functions which, in both analyses, separated only the nursing and college groups.

As Figure 5-7 illustrates, the temperament variables contributed more to the discrimination of the female groups than they did to the six male groups. The group separation achieved, however, was primarily a function of the interest scores.

The results using the SIB items are presented in Figure 5-8. Again, the first function was primarily a measure of socioeconomic environment.

Those variables from the four major categories which made the largest contribution in separating the six educational groups were combined in a fifth analysis for each sex. Twenty-seven variables each for the males and for the females were selected for this analysis. Of the 27 variables, 17 were the same for both males and females. These variables, along with the group means and standard deviations, are listed in Tables 5-6 (males) and 5-7 (females).

On both analyses, the first two functions accounted for 87 per cent of the total discriminating power of all 27 variables. These two functions for both the male and female analyses are presented in Table F-5 The plot of the six group centroids for the male analysis is presented in

Table 5-6

Post-High-School Educational Group Means and Standard Deviations (Males)

	Variable	Four-Year College		Junior College		Armed Forces School		Technical Institute		Trade School		No Post-H.S. Education	
		$\overline{X}$	S.D	$\overline{X}$	S.D	$\overline{X}$	S.D	$\overline{X}$	S.D	$\overline{X}$	S.D	$\overline{X}$	S.D
R-102	Vocabulary Info	16.03	3.01	14.73	3.00	14.12	3.17	13.84	3.28	12.80	3.30	12.61	3.37
R-105	Social Studies Info	19.15	4.02	17.98	4.16	17.14	4.19	16.95	4.12	15.61	4.49	15.77	4.75
R-106	Math Info	14.84	5.17	11.95	4.90	10.07	4.99	10.84	5.26	8.64	4.83	7.82	4.50
R-111	Electrical Info	11.38	4.48	10.58	3.93	10.70	3.87	11.03	4.55	9.90	4.12	8.86	3.53
R-112	Mechanical Info	13.89	2.84	13.31	2.98	13.83	2.86	13.87	2.76	13.19	3.10	12.82	3.01
R-114	Home Economics Info	9.65	2.97	8.94	2.82	9.18	2.64	9.10	2.89	8.92	2.83	8.62	2.71
R-115	Sports Info	9.87	2.38	8.93	2.56	8.52	2.60	8.32	2.53	7.53	2.73	7.96	2.66
R-138	Military Info	3.13	1.36	3.00	1.37	2.85	1.43	2.64	1.48	2.29	1.29	2.33	1.28
R-139	Business Info	5.63	1.72	5.08	1.77	5.01	1.77	4.75	1.78	4.55	1.83	4.73	1.80
R-230	English Total	88.87	8.73	84.39	10.03	81.21	10.87	80.33	10.08	77.03	11.08	77.60	11.69
R-240	Word Functions in Sentences	13.70	5.20	11.71	5.41	9.83	4.72	9.64	4.56	8.57	3.99	8.30	4.50
R-250	Reading Comp.	37.26	7.57	34.40	8.24	32.94	9.07	31.02	9.18	28.90	9.55	28.17	9.53
R-270	Mech. Reasoning	14.32	3.73	13.88	3.64	14.17	3.28	13.69	3.72	13.47	3.62	12.19	3.84
R-282	Visualization in 3 Dimensions	10.35	3.05	10.08	3.17	10.16	2.86	10.22	3.30	9.83	3.15	8.52	3.23

Table 5-6 (cont.)

Post-High-School Educational Group Means and Standard Deviations (Males)

	Variable	Four-Year College		Junior College		Armed Forces School		Technical Institute		Trade School		No Post-H.S. Education	
		$\bar{X}$	S.D	$\bar{X}$	S.D	$\bar{X}$	S.D	$\bar{X}$	S.D	$\bar{X}$	S.D	$\bar{X}$	S.D
R-340	Math Total	32.33	9.30	27.42	8.71	24.37	8.54	25.35	9.26	22.17	8.06	20.65	7.43
F-420	Table Reading	10.35	6.60	11.00	8.09	10.87	10.52	10.66	9.17	9.44	12.57	7.93	8.40
F*701	Physical Science Interest	36.61	12.89	34.04	12.31	31.71	12.14	34.40	12.90	29.86	13.07	28.48	11.95
F*704	Literary-Linguistic Interest	29.88	10.91	26.92	11.98	25.14	11.21	24.48	11.85	22.77	11.69	24.42	10.92
F*711	Sales Interest	10.51	4.98	10.36	5.19	8.95	4.99	10.03	4.92	9.54	5.18	9.84	5.05
F*714	Mech.-Tech. Interest	24.34	10.87	27.36	10.70	31.58	10.60	31.46	11.28	32.18	11.17	30.18	11.41
SIB-172	Family home value	3.79	1.37	3.59	1.54	3.66	1.53	3.62	1.49	3.47	1.60	3.44	1.65
SIB-195	Own room, desk, typewriter	3.09	.95	2.85	.98	2.67	1.02	2.88	1.00	2.62	1.03	2.43	1.00
SIB-197	No. of power tools	3.36	1.80	3.21	1.79	3.52	1.84	3.51	1.86	3.60	1.78	3.13	1.80
SIB-198	No. of cars	2.65	.85	2.67	.95	2.61	.99	2.70	1.01	2.69	.97	2.46	1.03
SIB-206	Father's occupation	3.48	1.19	3.21	1.20	2.87	1.27	3.09	1.33	2.76	1.19	2.82	1.28
SIB-218	Father's education	5.31	2.06	4.74	1.89	4.19	1.93	4.33	1.90	3.93	1.61	3.89	1.74
SIB-219	Mother's education	5.41	1.65	5.02	1.63	4.41	1.65	4.45	1.68	4.25	1.60	4.01	1.52

Table 5-7

Post-High-School Educational Group Means and Standard Deviations (Females)

	Variable	Four-Year College		Nursing School		Junior College		Business School		Trade School		No Post-H.S. Education	
		$\bar{X}$	S.D	$\bar{X}$	S.D	$\bar{X}$	S.D	$\bar{X}$	S.D	$\bar{X}$	S.D	$\bar{X}$	S.D
R-104	Music Info	8.70	2.45	8.04	2.46	7.95	2.46	6.97	2.53	6.41	2.68	6.38	2.62
R-106	Math Info	12.40	5.40	11.45	4.72	9.16	4.40	7.43	4.36	6.12	3.87	6.08	3.94
R-107	Physical Science Info	9.30	3.76	9.20	3.35	7.51	3.66	7.32	3.39	6.37	3.24	6.14	3.23
R-108	Biological Science Info	6.97	2.00	7.07	1.94	6.25	2.11	5.81	2.09	5.43	2.23	5.24	1.90
R-114	Home Economics Info	14.19	3.05	14.35	2.88	13.11	2.94	13.12	2.90	13.04	3.14	13.03	2.94
R-139	Business Info	5.75	1.81	5.24	1.62	5.07	1.81	4.82	1.89	4.62	1.79	4.73	1.83
R-212	Memory for Words	15.34	5.34	15.29	4.95	14.06	5.48	12.92	5.43	11.85	4.86	11.94	5.16
R-230	English Total	92.97	9.53	92.41	7.69	90.61	7.72	87.83	10.44	83.79	10.06	85.17	9.89
R-240	Word Functions in Sentences	15.23	5.14	14.90	4.94	13.27	5.32	11.59	5.21	9.86	4.61	10.26	5.25
R-250	Reading Comp.	38.06	7.30	37.60	6.35	35.42	7.12	32.90	8.56	29.84	8.33	30.10	8.73
R-282	Visualization in 3 Dimensions	9.54	3.13	9.17	2.83	8.54	2.87	8.54	2.85	8.30	2.73	8.18	2.74
R-340	Math Total	29.38	9.48	27.38	7.17	23.99	7.73	21.24	7.45	19.03	7.10	18.81	6.75
F-420	Table Reading	11.66	6.07	12.18	5.69	11.33	7.48	11.07	6.18	10.83	7.76	10.39	6.49
R-610	Mature Personality (SAI scale)	13.95	5.12	13.99	5.19	12.12	5.34	11.40	4.90	10.94	5.45	11.22	5.09

Table 5-7 (cont.)

Post-High-School Educational Group Means and Standard Deviations (Females)

	Variable	Four-Year College		Nursing School		Junior College		Business School		Trade School		No Post-H.S. Education	
		$\overline{X}$	S.D	$\overline{X}$	S.D	$\overline{X}$	S.D	$\overline{X}$	S.D	$\overline{X}$	S.D	$\overline{X}$	S.D
F*701	Physical Science Interest	24.69	11.94	25.15	10.79	19.37	12.17	17.12	10.62	17.21	9.41	17.23	11.41
F*702	Biological Science and Medicine Int.	16.35	7.39	21.94	6.20	14.50	7.92	11.93	7.10	12.54	6.72	11.50	7.49
F*704	Literary-Linguistic Interest	38.99	11.72	34.44	12.42	33.87	12.76	30.58	12.63	29.64	12.45	29.77	12.69
F*705	Social Service Interest	31.84	7.57	31.35	6.99	29.75	7.94	27.05	8.10	26.44	7.94	28.10	8.22
F*713	Office Work Interest	12.47	6.22	11.61	6.18	13.17	6.52	16.42	5.66	14.75	5.23	17.05	5.09
SIB-191	No. of entertainment appliances	4.84	.53	4.84	.41	4.77	.58	4.72	.59	4.62	.75	4.59	.79
SIB-193	No. of cult. entertainment items	3.18	1.20	2.73	1.17	2.91	1.21	2.71	1.17	2.77	1.23	2.48	1.16
SIB-195	Own room, desk, typewriter	3.12	.91	2.94	.92	3.04	.92	2.92	.94	2.89	.93	2.61	.98
SIB-197	No. of power tools	3.01	1.79	3.12	1.77	2.89	1.78	3.39	1.88	3.38	1.88	2.82	1.69
SIB-198	No. of cars	2.53	.81	2.41	.70	2.49	.78	2.50	.87	2.60	.92	2.27	.81
SIB-206	Father's occupation	3.56	1.17	3.12	1.28	3.42	1.27	2.99	1.25	2.94	1.29	2.62	1.32
SIB-218	Father's education	5.37	2.09	4.68	1.80	4.95	1.95	4.12	1.64	3.92	1.59	3.82	1.64
SIB-219	Mother's education	5.55	1.62	4.83	1.46	5.00	1.71	4.54	1.54	4.37	1.53	4.15	1.45

Figure 5-5

Centroids of Six Female Groups in the Discriminant Space Formed by the Information Variables

Grade 11

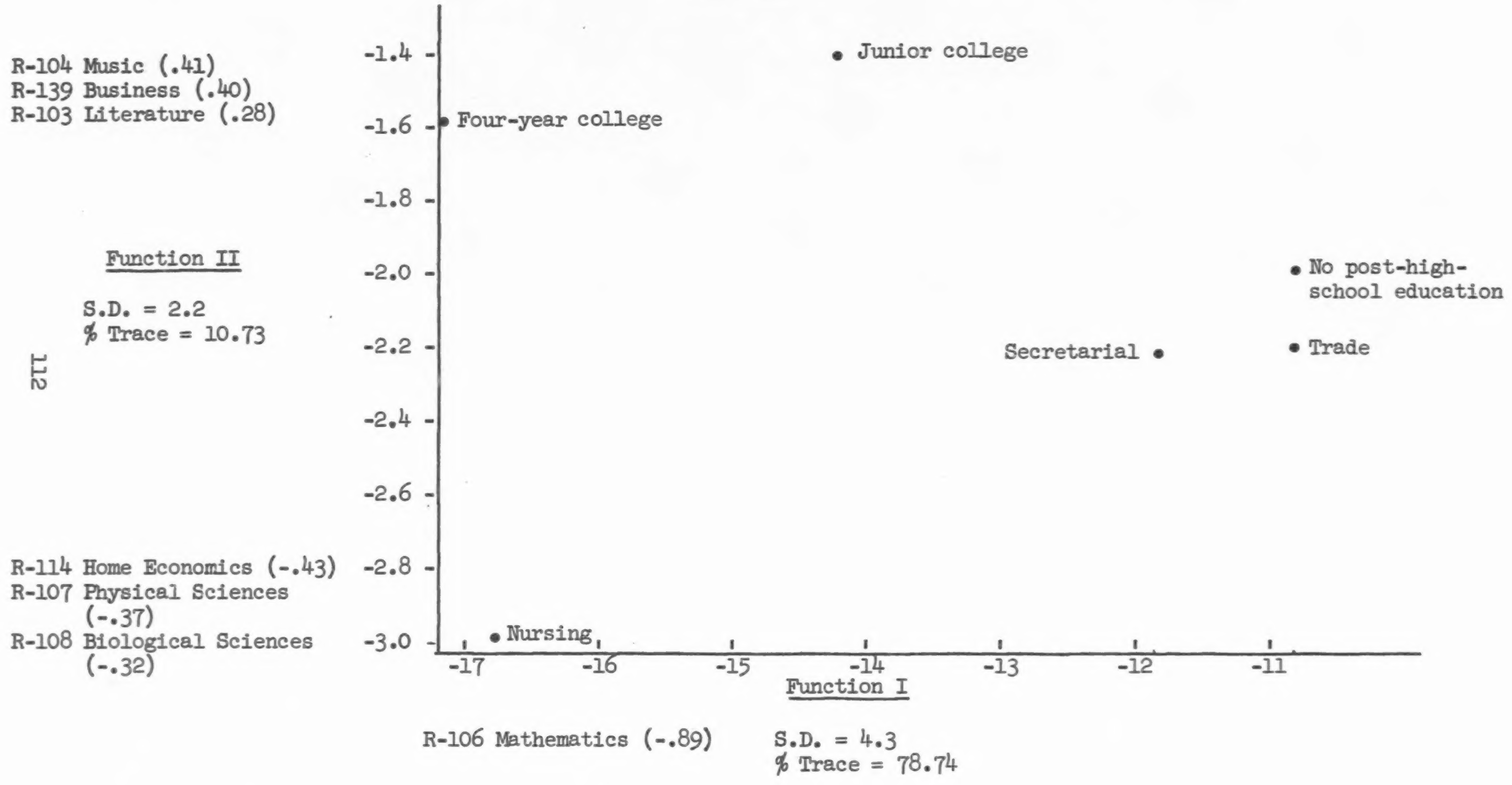


Figure 5-6

Centroids of Six Female Groups in the Discriminant Space Formed Using Ability Variables

Grade 11

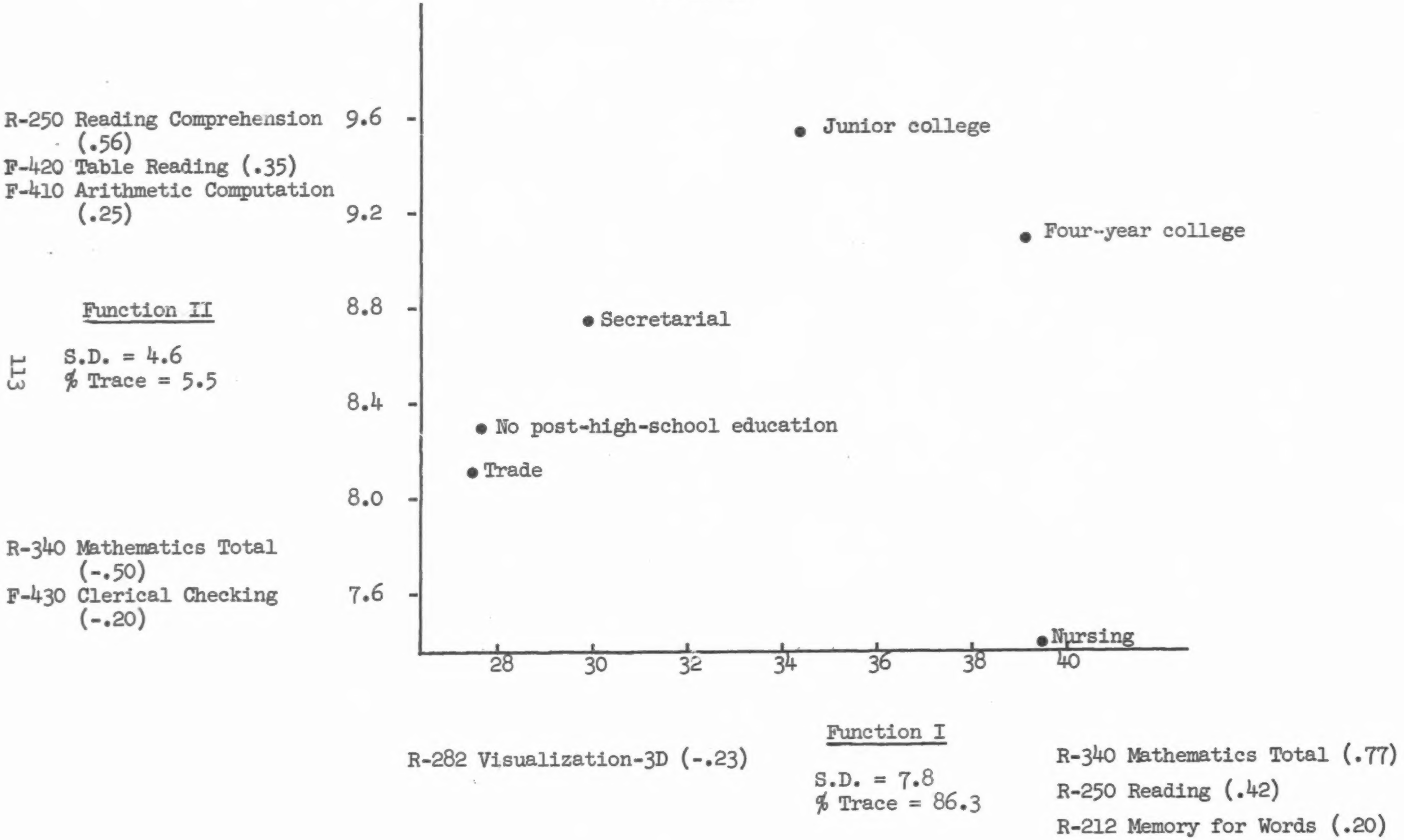


Figure 5-7

Centroids of Six Female Groups in the Discriminant Space Formed Using Temperament-Interest Variables

Grade 11

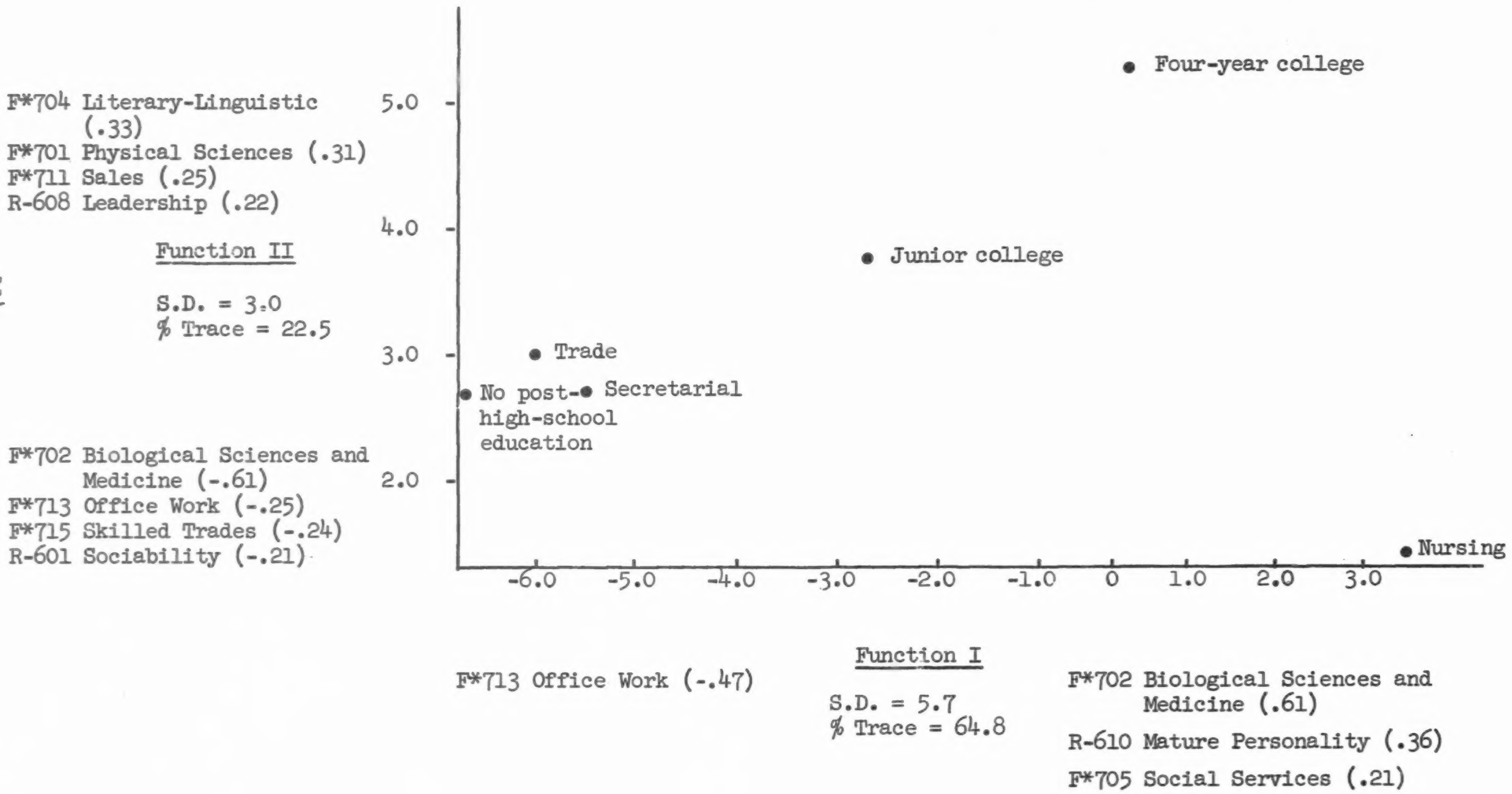


Figure 5-8

Centroids of Six Female Groups in the Discriminant Space Formed Using the Student Information Blank Items

Grade 11

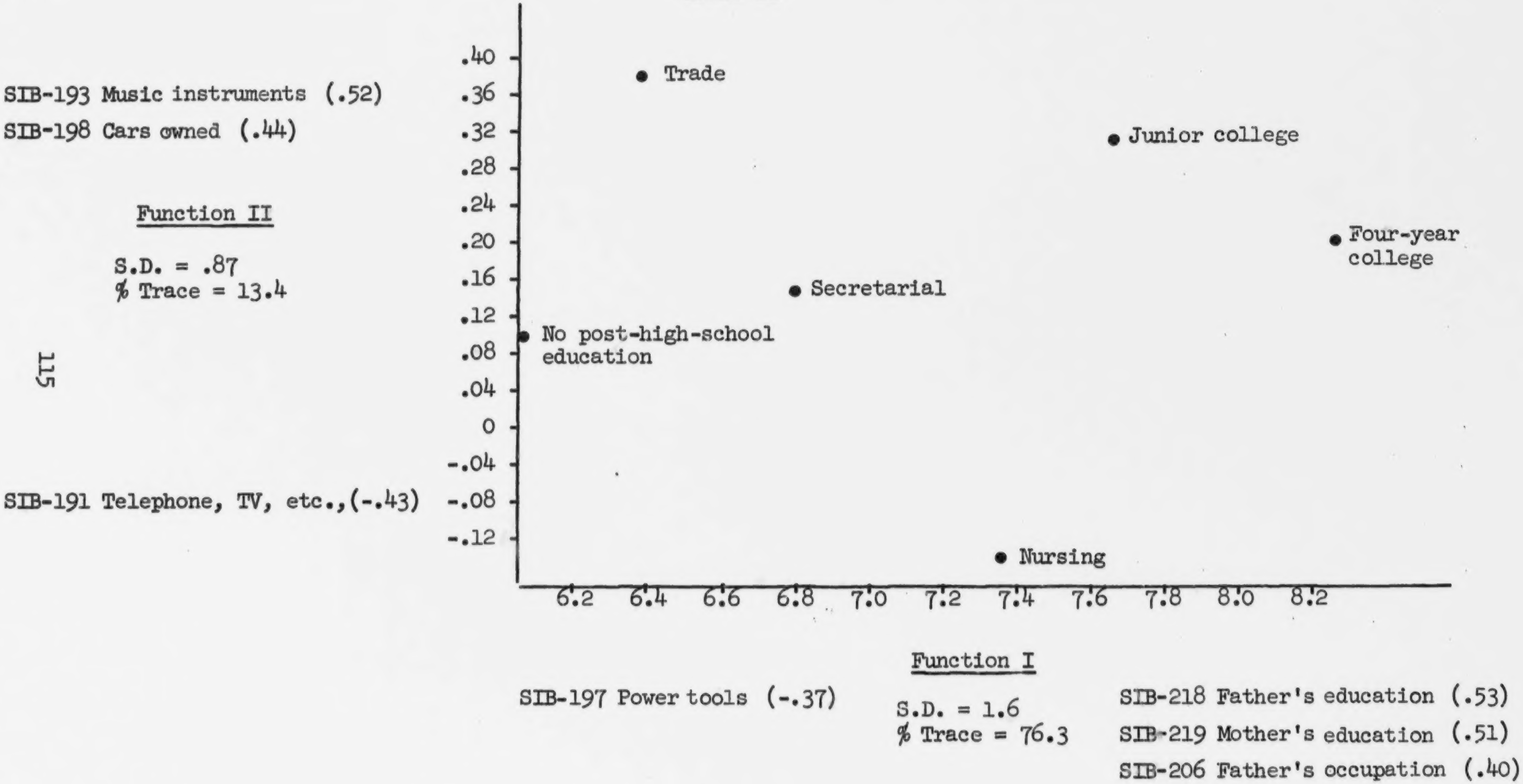


Figure 5-9. The arrangement of the centroids is virtually identical to that produced by the four previous analyses. The first function distributed the groups into four intervals, with the college group at one extreme and the no post-high-school education and trade groups at the other. The second function differentiated those groups having identical or near identical scores on the first function, the technical and Armed Forces groups as well as trade and no post-high-school education groups.

As was the case with the male analysis, the results of using the best variables to differentiate the six female groups, presented in Figure 5-10, substantiate a pattern seen in the previous four discriminant analyses. The college and nursing groups had almost identical scores on the first function, but were at opposite extremes on the second. Understandably, the variable which separated these two groups on the second function was Biological Science and Medical Interest (R-702). The no post-high-school education, trade, and secretarial-business groups were very close in the discriminant space.

Discussion. This one-year look at what students did in terms of education goes a long way toward clarifying the differences between groups of students who select these various alternatives. The results accrue value both in terms of description and prediction relative to the degree of confidence we can have that the six groups identified encompass the major educational paths available to high-school graduates.

Of course, for any groups one identifies, there will be some individuals who later leave or enter them. Students who found jobs after high school may later decide to enter college, and vice versa. However, there is good reason to believe that these groups possess a large degree of stability, and that they provide considerable insight into the dynamics of post-high-school education. As an elaboration of the earlier publications, the further division of three groups into six categories answers many of the questions raised.

Study Habits and Extracurricular Behavior

The academic strengths and deficiencies characteristic of various

Figure 5-9

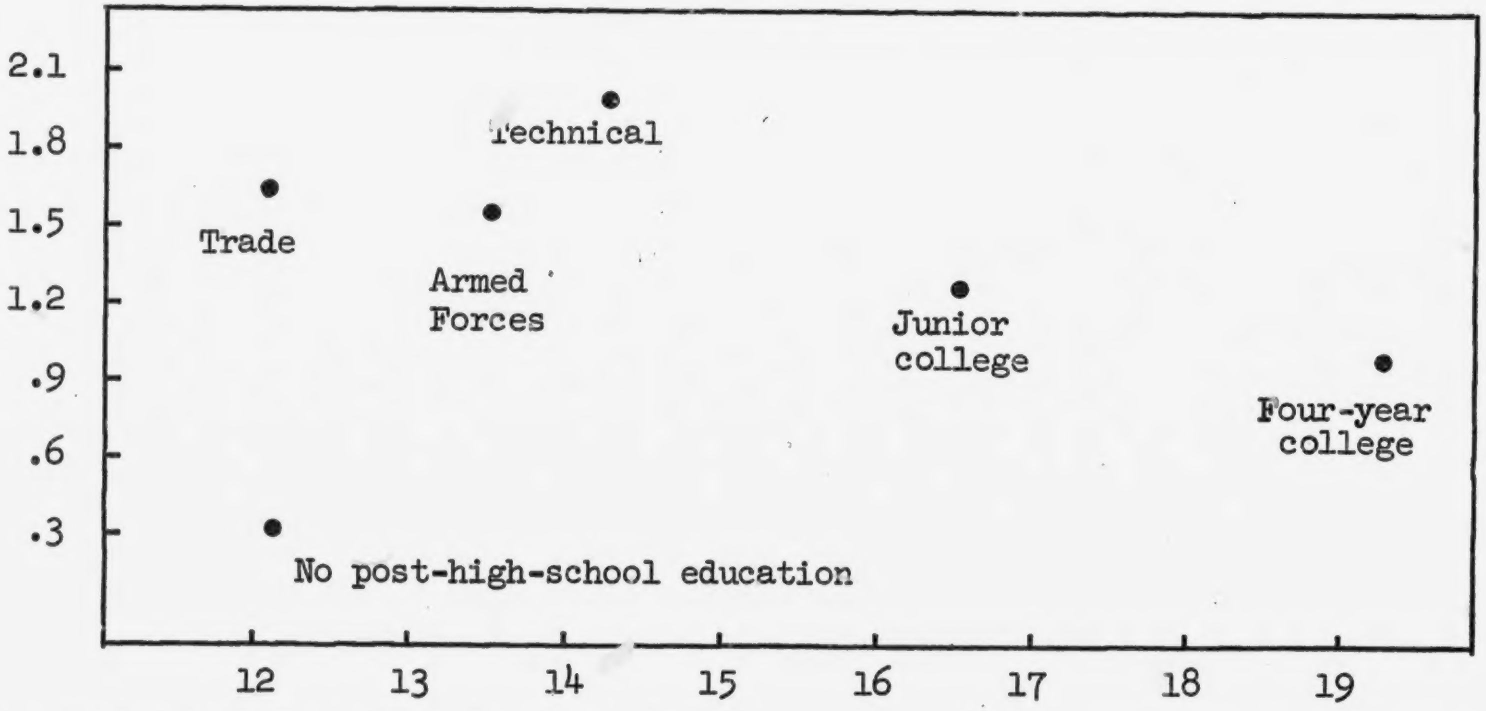
Centroids of Six Male Groups in the Discriminant Space Formed Using a Combination of Variables

Grade 11

R-282 - Visualization in Three Dimensions (.46)
F-420 - Table Reading (.34)
SIB-195 - Own room (.30)x
F*714 - Mechanical-Technical Interest (.26)
R-111 - Electrical Information (.25)

Function II
S.D. = 2.1
% Trace = 11.7

R-139 - Business Information (-.35)
R-230 - English Total (-.22)



F*714 - Mechanical-Technical Interest (-.58)

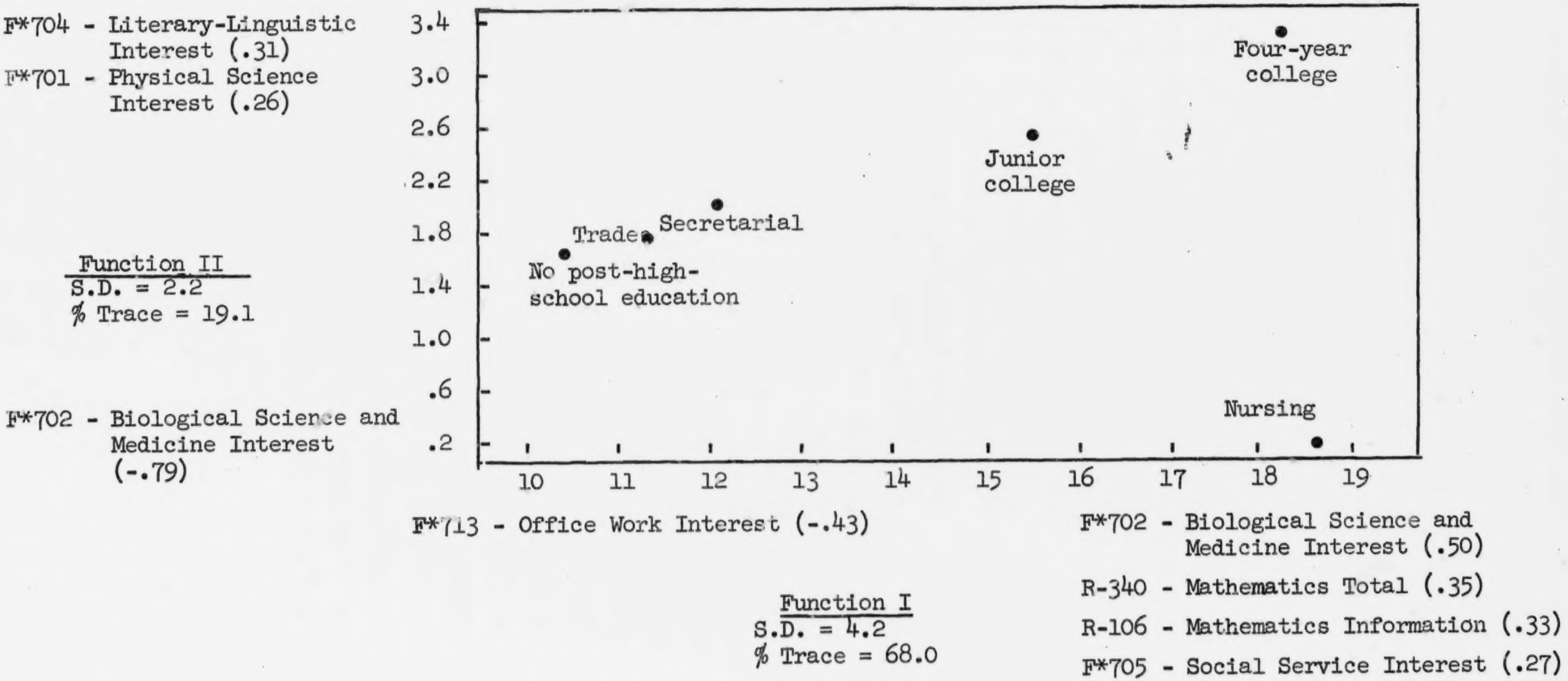
Function I
S.D. = 4.0
% Trace = 75.9

R-106 - Mathematics Information (.35)
SIB-219 - Mother's education (.28)
F*701 - Physical Science Interest (.25)
R-240 - Word Functions in Sentences (.24)

Figure 5-10

Centroids of Six Female Groups in the Discriminant Space Formed Using a Combination of Variables

Grade 11



groups of high-school students have been fairly well publicized. In this section, 1960 twelfth graders who responded to the one-year follow-up questionnaire were divided into two groups: college (including junior college) versus noncollege. These groups were then compared in terms of interest, extracurricular activities, and study behavior using items from the Student Information Blank, a detailed questionnaire answered by the high-school students in 1960. The college versus noncollege classifications were made by means of response to an item concerning college attendance on the first of the follow-up studies which was made one year after high-school graduation.

The percentages reported in this section were based on the following Grade 12 students:

Noncollege		College	
Males	Females	Males	Females
7,606	12,130	10,575	9,242

Responses to the Background-Information questionnaire indicate that students can be identified in terms of college versus noncollege choice according to dimensions other than aptitude, namely dimensions of interest, activities, and behavior. Many of the data collected tended to confirm what most people already knew: parents of students entering college were more highly educated, had higher incomes, held more prestigious jobs, and had higher expectations for their children than parents of noncollege students. However, many of the specific components of the data were new and generally unreported. For example, the data showed differences in the amounts of time students studied each week and differences in the conviction of the future utility of their courses for the two groups.

Study Habits. As one might expect, students who later entered college spent more time studying while in high school than those who did not. As shown in Figure 5-11, girls studied more than boys, regardless of college plans, and those who entered college studied considerably more than those not in college.

Figure 5-11

Per Cent Who Reported They Studied More Than 10 Hours Per Week

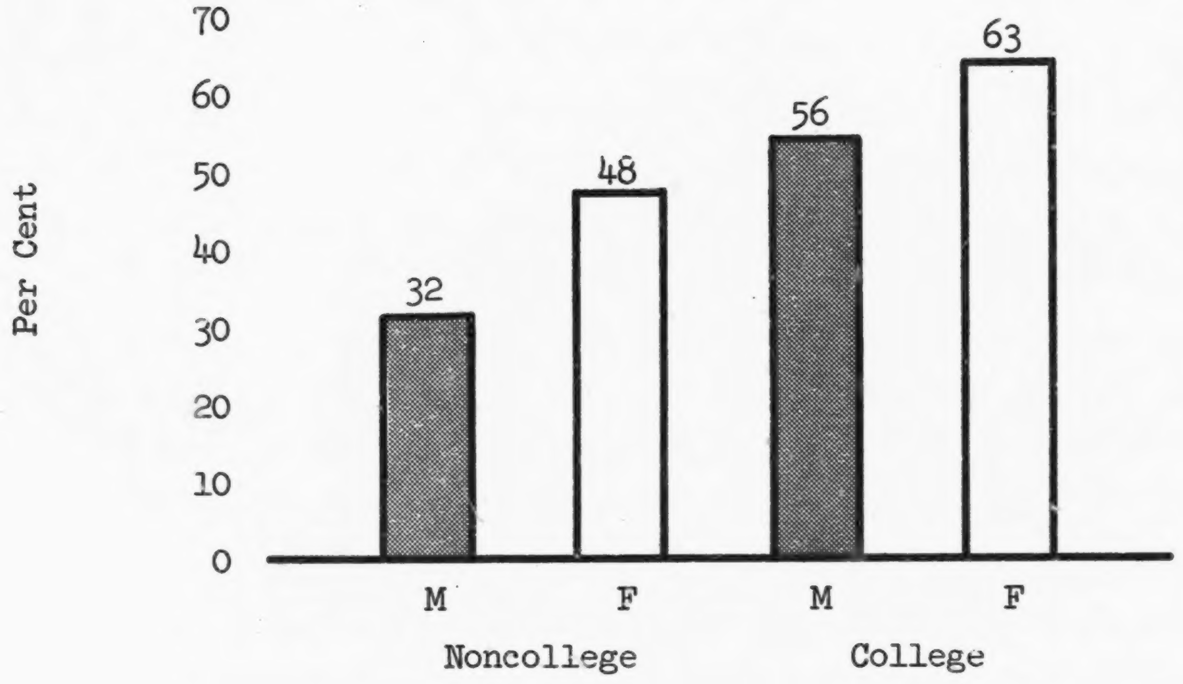
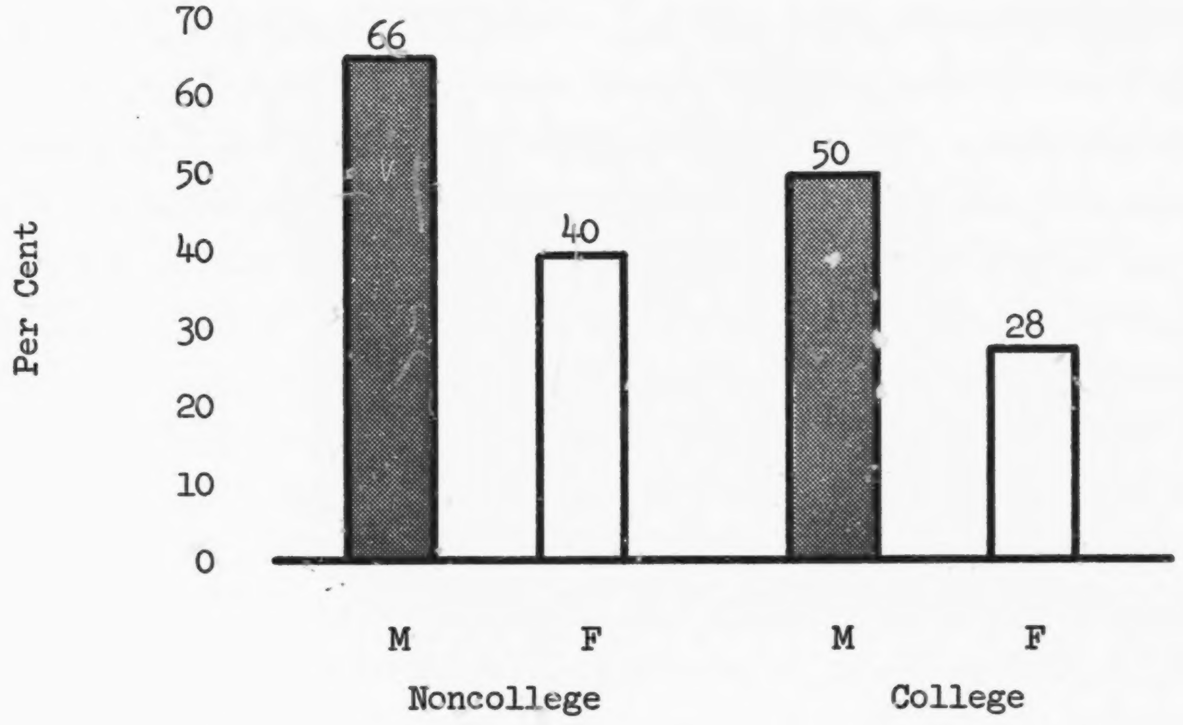


Figure 5-12

Per Cent Who Reported They Usually Did Only Enough to Get by Unless They Really Liked the Course



An attitude that bears directly on amount of study behavior is interest in course material. Figure 5-12 illustrates that males and noncollege groups were much less likely to put forth more than minimal effort unless they really liked a course.

An additional influence on the amount of study is the perceived relationship between the course content and its utility. Figure 5-13 demonstrates that considerably more noncollege students felt that they were usually taking courses that would not help them in an occupation after they left school. Of course, schools are not designed exclusively for occupational preparation.

One possibility is that college-bound students are aware of the necessity for having adequate course grades to gain admission to college. They may perceive good grades as an important means to the achievement of their end, acceptance by the college of their choice. Noncollege students, on the other hand, may have a greater commitment to high-school graduation rather than to graduation with outstanding grades. Realizing that graduation is prerequisite to employment, they may be more interested in this than the additional goal of good grades. Such an explanation would account for most of the observed differences in study behavior and attitudes.

Social Activities. Since a large percentage of the noncollege students did not spend their time studying, they spent more time in social pursuits than did their college-bound classmates. Fifty-one per cent of the noncollege males and 42 per cent of the females (Figure 5-14) responded that they usually went out three or more nights a week during the school year. Within both groups, a smaller percentage of girls went out three or more times per week.

Questions related to dating indicate two patterns. One reflects the fact that noncollege students dated more than did those who went to college. The other is a result of sex differences. Twelfth-grade girls did much more dating than did boys in grade 12. The above relationship is depicted in Figure 5-15.

In general, the noncollege group was much more active socially during high school. The girls were more active in dating, and boys more frequently went out at night for fun and recreation.

Figure 5-13

Per Cent Who Said That One-Half or More of Their Courses Would Not Help Them in an Occupation after Leaving School

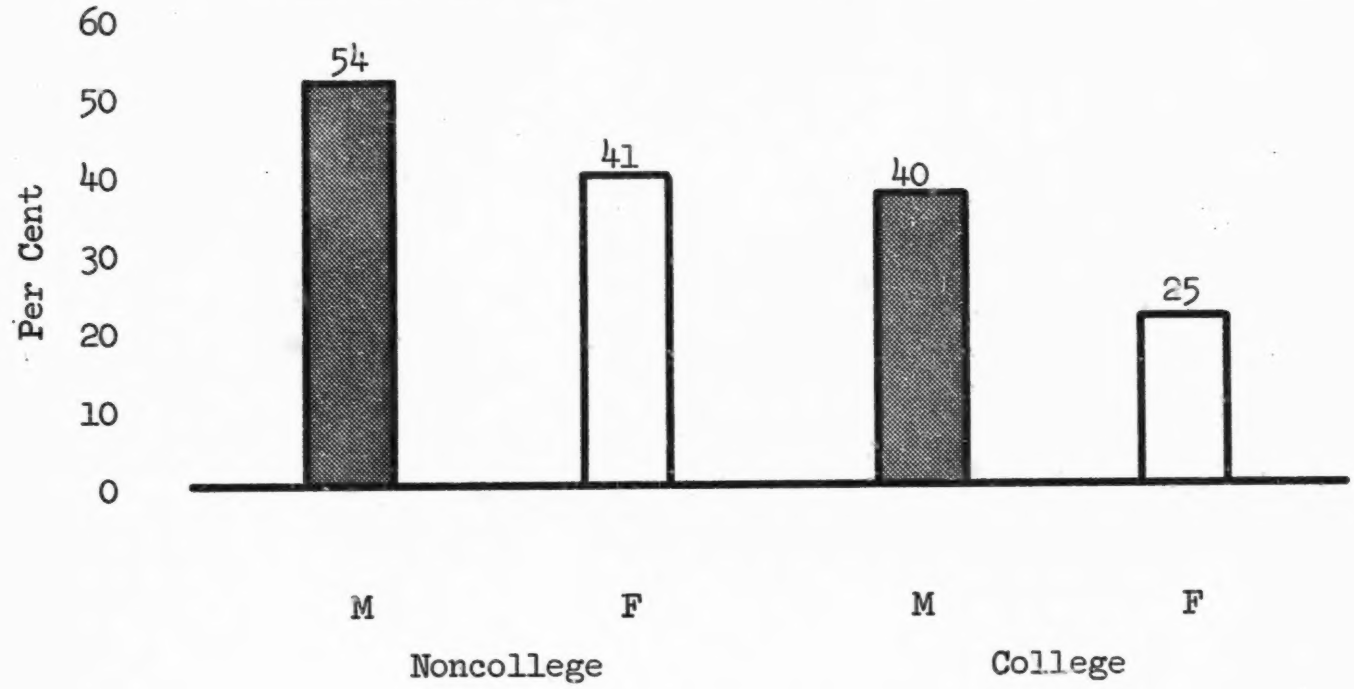


Figure 5-14

Per Cent Who Said They Went Out Three Nights or More Per Week during the School Year

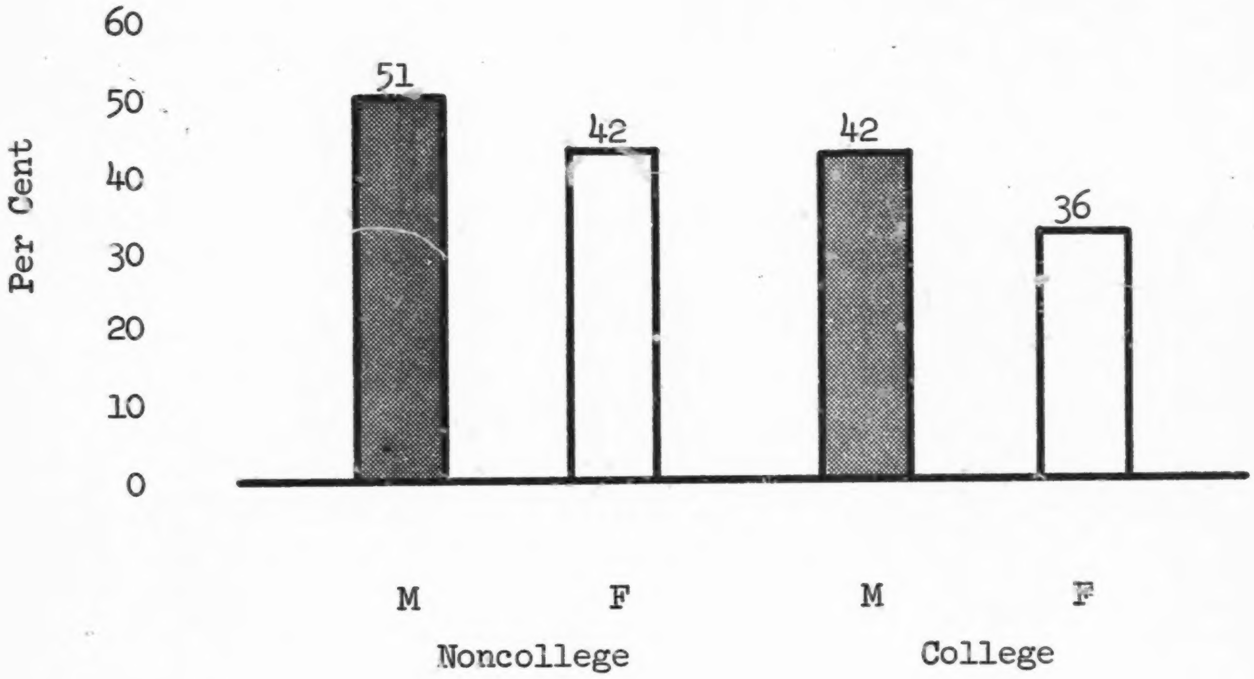


Figure 5-15

Per Cent Who Reported They Had Two or More Dates Per Week

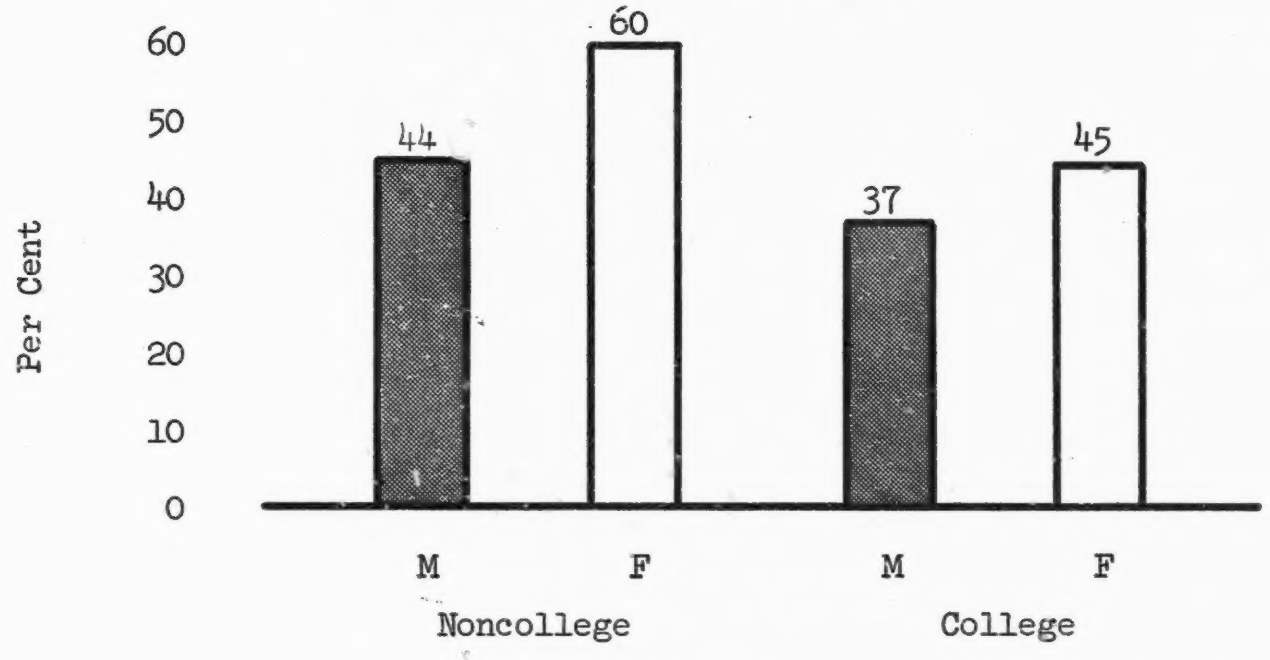
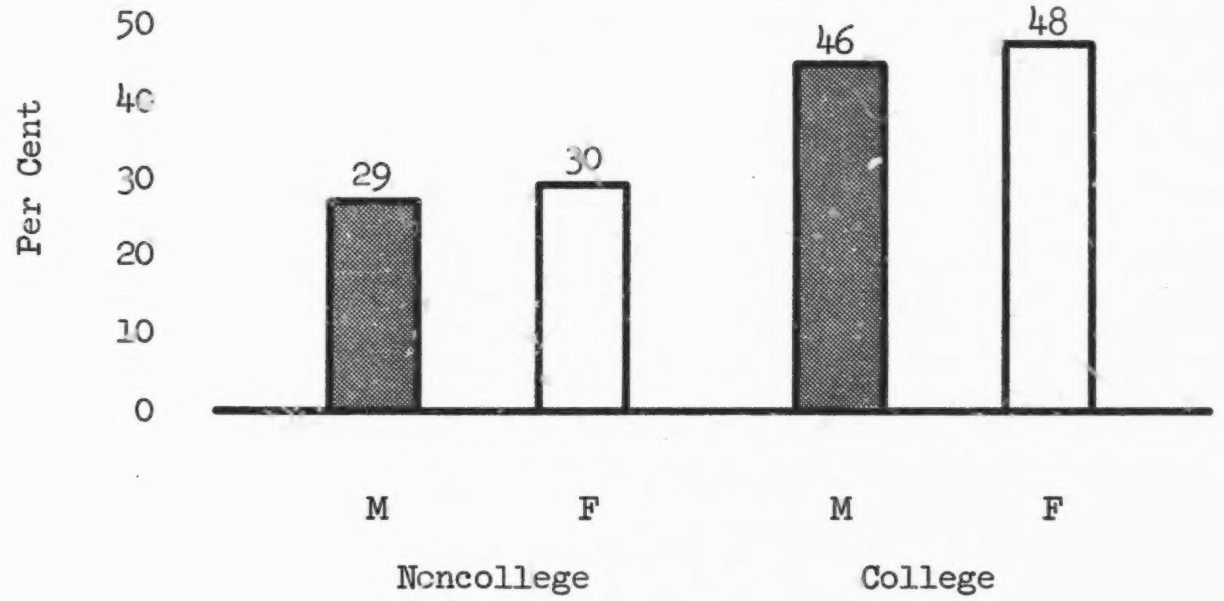


Figure 5-16

Per Cent Who Reported They Were Member of School-Subject-Matter Clubs such as Science, Mathematics, Language, or History



School Clubs and Organizations. As shown in Figures 5-16, 5-17, and 5-18 social activity and school or scholastic activities were inversely related. The college-bound high-school students, for example, were less active socially than the noncollege group, but spent more hours per week studying and in school activities.

The interests of the high-school students who did not go on to college centered on hobby clubs, with electronics, cabinetmaking, woodworking, and metalworking being popular among noncollege males. Figure 5-19 is an example of the response pattern characteristic of items soliciting this type of information.

Work. As one might expect from knowledge of differences in socioeconomic background, there was a distinct difference between noncollege and college groups with regard to working habits and work experience. Males and females who did not attend college worked more around the house, started summer employment at an earlier age, and worked more during the school year. Figure 5-20 presents the percentages of those who worked six or more hours per week doing chores around the house. The number of hours per week the student worked for pay during the school year (Figure 5-21) was also related to both sex and college attendance.

Driving. In general, the noncollege group spent more time in activities related to cars. They drove somewhat more (both cars and motorcycles) and spent more time in auto-mechanical activities (Figure 5-22). More of them had cars for their own use (Figure 5-23).

Discussion. One or two general points concerning response bias seem pertinent. Some on-going factor analytic research with the Project TALENT battery (as yet unpublished) confirms the existence of what might be called "response conformity." As used here, this is the tendency for students to respond to what they perceive to be the most socially acceptable answer as behavior characteristic of themselves. This form of distortion appears to be limited to certain items and scales designed to measure various facets of typical behavior.

While there is no reason to believe that the differences reported in this section are not real, they are probably exaggerated to some degree. The degree of response conformity appears to be related to

Figure 5-17

Per Cent Who Described Themselves as "Extremely Active," "Very Active," or "Fairly Active" in Debating, Dramatics, or Musical Clubs

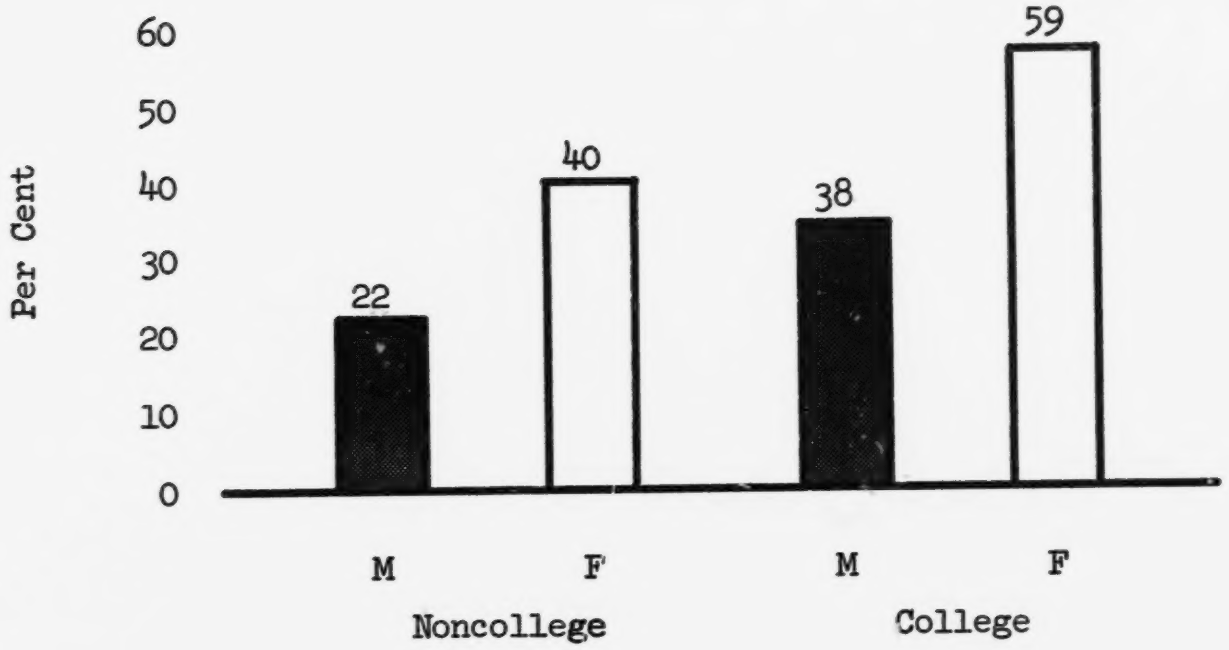


Figure 5-18

Per Cent Who Responded That They Were "Extremely Active," "Very Active," or "Fairly Active" in the School Newspaper, Magazine, or Annual

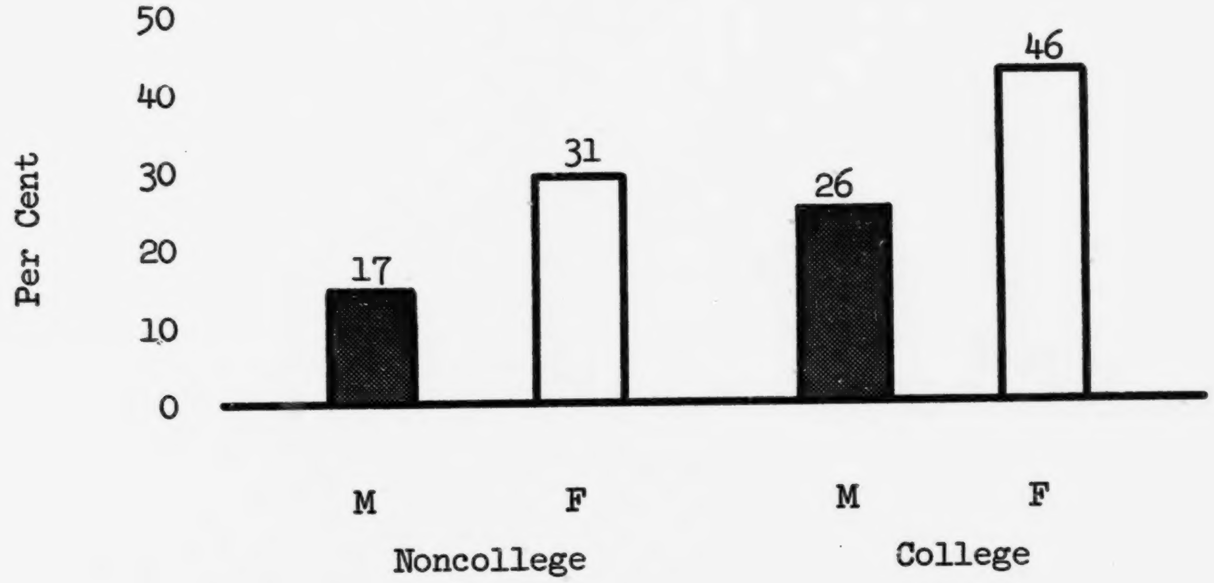


Figure 5-19

Per Cent Who Said They Had Done Metalworking in the Past Three Years

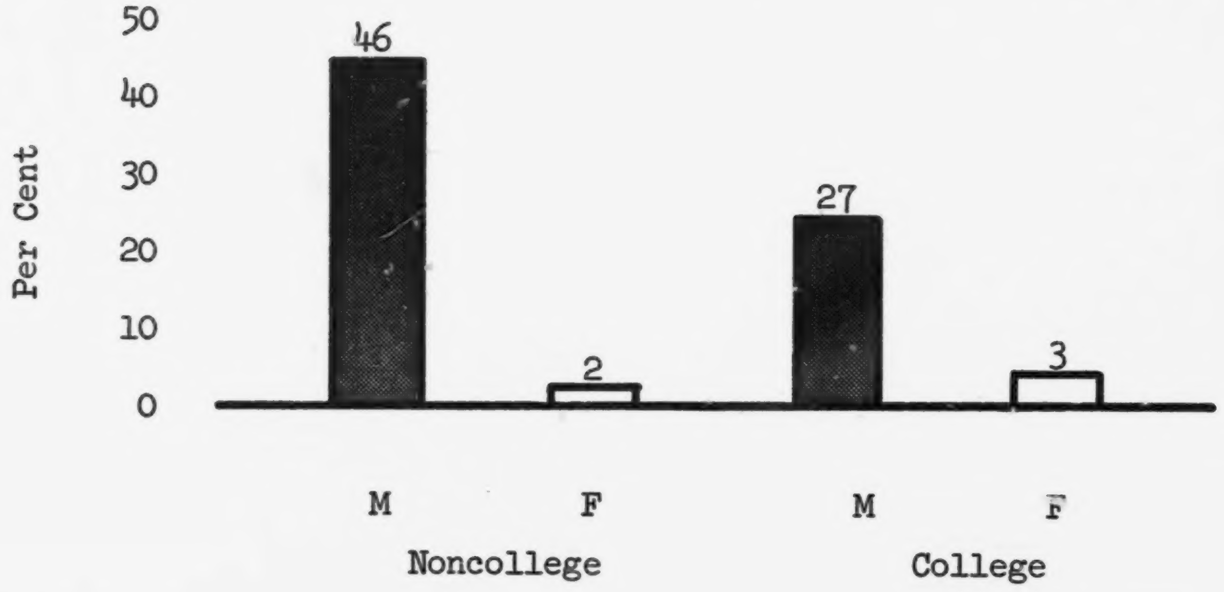


Figure 5-20

Per Cent Who Reported They Spent Six or More Hours a Week, on the Average, Doing Chores around the House

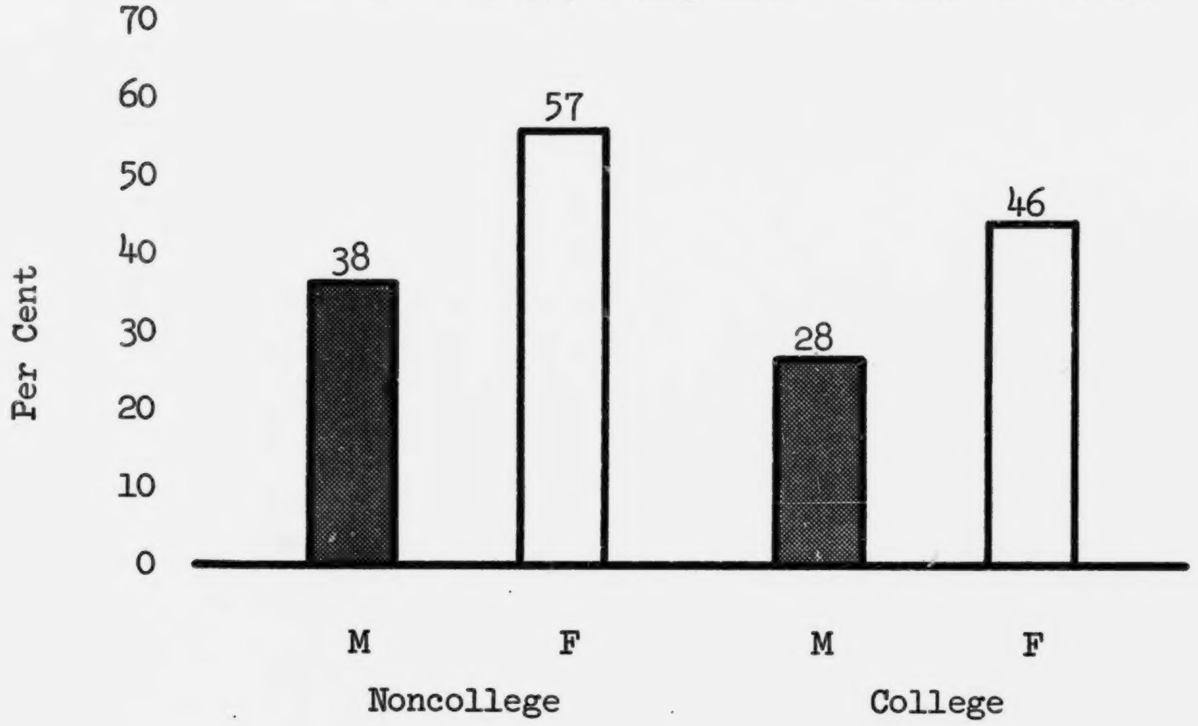


Figure 5-21

Per Cent Who Responded They Worked 16 or More Hours Per Week for Pay during the School Year

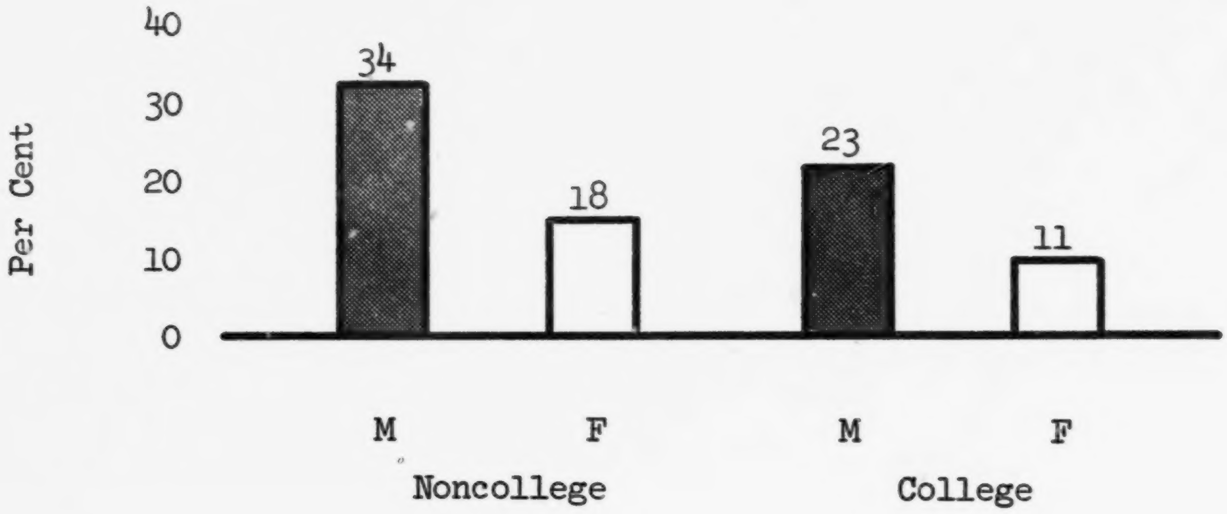


Figure 5-22

Per Cent Who Responded They Had a Car for Their Own Use

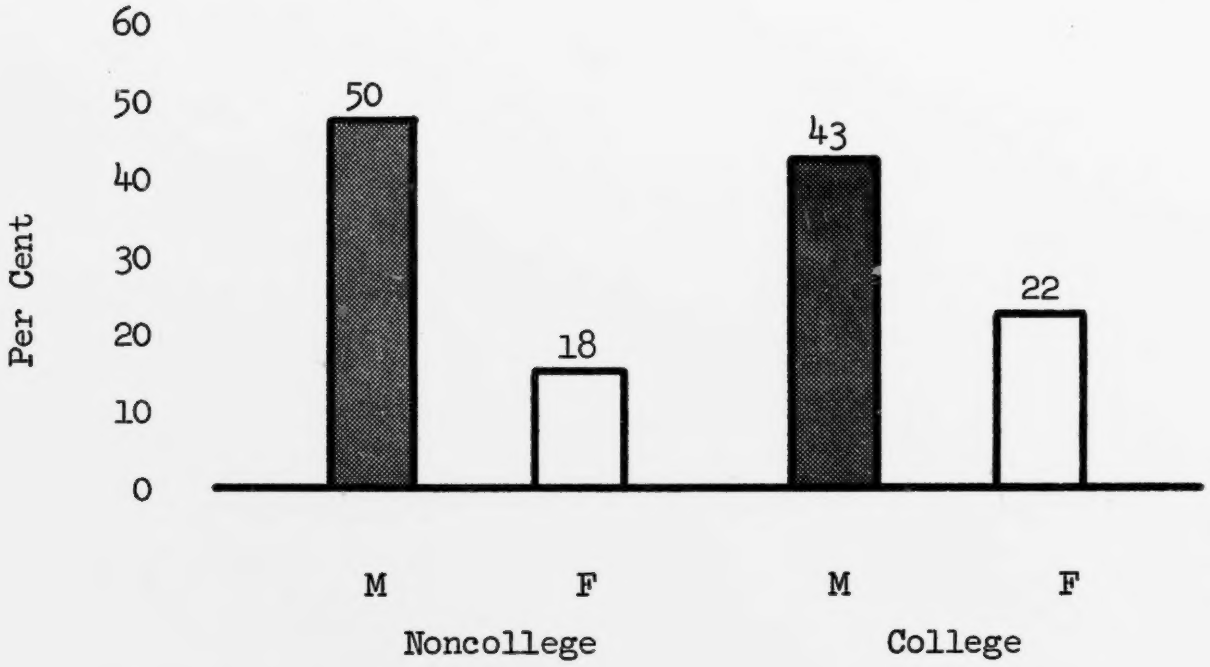
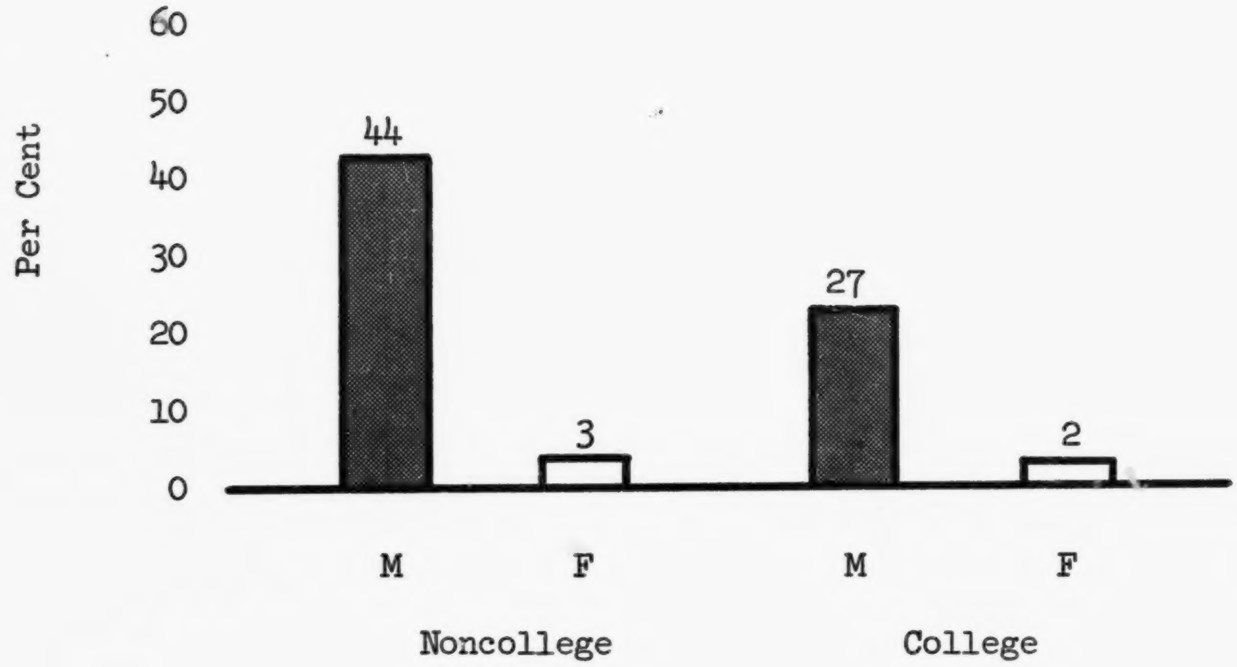


Figure 5-23

Per Cent Who Reported They Had Often Done Mechanical or Auto Repairs in the Past Three Years



socioeconomic background and intelligence. Given a certain amount of item transparency, those students with a "middle class orientation" seem to exhibit a greater need to attribute the socially acceptable response as applicable to themselves. Of course, both socioeconomic background and intelligence are highly related to membership in the college versus noncollege group. The net result is some unknown degree of distortion when comparing these two groups on various Student Information Blank items.

Summary and Conclusions

The results presented in this chapter represent a comprehensive look at the behavioral correlates of the educational pursuits students elect after high school. Six groups were defined which represent the major educational alternatives available to high-school graduates. Students reporting that they entered a given group were compared to those in other groups on numerous TALENT variables, using several methods of analysis.

The consistency in findings, independent of the variables or the analytic technique, was impressive. For the males, the largest difference was between those in the four-year college group and the remaining groups. The students who continued their education by enrolling in a college were considerably higher on all measures of ability, information, and socioeconomic environment. The junior-college group was also well differentiated from the remaining five groups, below the four-year college group on most variables but above the other four groups. As was shown, students in this group seemed to have a closer resemblance to the college group in socioeconomic environment than in ability. This was also observed for the females in junior college.

For the females, the interest, ability, and information variables differentiated those entering a four-year college or a three-year school of nursing from the remaining four groups. These two groups, four-year college and school of nursing, could not be differentiated on these variables but were very well differentiated by the Biological Interest scale, with the nursing students scoring considerably higher. The two highest groups on the ability variables, the college and nursing groups, were quite divergent on the socioeconomic variables, with the college group being considerably higher.

Although the remaining four male groups (trade, Armed Forces, technical, and no post-high-school education) and three female groups (trade, secretarial, and no post-high-school education) were differentiatable, the differences were much less clear-cut. It was usually one or two variables that separated one group from the others; whereas, most variables separated these groups from the college, junior college, and nursing groups.

These results are not only interesting, but extremely valuable. Although not in the form of a counseling or guidance guide, they are indicative of the types of variables that will weigh heavily when such a document is produced. These results explain in a definitive manner the TALENT variables which differentiate students electing one post-high-school educational path to the exclusion of others.

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Chapter 6

Differences among College Students

William W. Cooley

The previous chapter showed how those students who enter a four-year college differ from those who elect other forms of post-high-school education. It is also obvious that college students differ widely among themselves. This chapter will consider two specific types of differences: (1) the ways in which students differ from college to college, and (2) the differences among students in various major fields of study.

College Types vs. Traits

There certainly can be no doubt that higher education is an important aspect of career development. Not only is the decision to go to college important, but the particular college or university a student attends is also a factor in determining what he does during his adult life. In most studies of the career process the investigator can do little more than consider whether or not the subject attended a college. However, with the large Project TALENT sample, it is possible to explore the proposition that colleges differ greatly in the types of students they attract, admit, and graduate, and these differences may affect such things as the student's success at school, choice of college major, graduation or not, graduate school or not, and post-college work.

For example, if we had an adequate basis for talking about the differences among colleges, we could probably make some contribution to a very large problem currently emerging in higher education--the problem of the transfer student. A great deal of this migratory behavior from school to school may be in part a function of the differences between the attributes of the transfer student and the modal attributes of the students who attend the college from which he is departing. Never before has it been possible to study whether or not changes in colleges are in part a function of such mismatches.

The first Project TALENT effort to deal with college differences was a taxonomy approach. In Appendix L of The American High School

Student (Flanagan et al., 1964) a taxonomy for classifying colleges was presented. That first approximation focused on the ability levels of the entering student and the broad purposes of the institution. The five-digit code used was based on the following information: (1) primary program and accreditation (i.e., liberal arts, teacher preparatory, unaccredited, etc.); (2) control (i.e., public or non-public) and student sex (coeducational, all male, or all female); (3) endowment and the number of National Merit scholars attending; (4) types of liberal arts programs; and (5) enrollment. Each institution was then placed in one of the 25 categories which resulted. Although this was a good first approximation to college classification, certain difficulties were encountered in using this taxonomy. One difficulty with the taxonomy approach is that, although you may find a dozen colleges which are alike in some respects, they will be different in other respects. Of course the goal was to identify the major differences and group accordingly, but an acceptable decision as to the nature of the major differences is not easily reached.

Another difficulty with a taxonomy approach is that interpretation is made extremely difficult when differences between two types are found. This is because the typology is based upon several different considerations. If we find, for example, that students attending type A schools differ from students in type B schools on variable X, we cannot say which of the five or more differences between the type A and B schools may be producing this observed difference in students attending. Of course it is never possible to nail down precisely such cause and effect relationships in survey data, but it certainly is possible to narrow the range of possible explanations by using an approach which does not offer so many alternative explanations for an observed difference.

Perhaps recognizing the problems of creating a workable taxonomy, Alexander Astin (1965) presents an excellent study in which he located colleges on each of 13 dimensions. He used a trait approach rather than a taxonomy approach, and the results are very encouraging. His 13 dimensions are in terms of five input variables (the characteristics of the incoming students) and eight treatment variables (the programs offered by the institution). He does not try to put each institution into one of 25 or so categories, but considers an institution as we do individuals in an attribute space. If two institutions tend to have the same combinations on these 13 dimensions, they can then be considered similar; but it is also possible to talk about two institutions that are similar on six dimensions but differ considerably on seven other dimensions.

Another important advantage of a trait model over a taxonomy model is that a highly developed methodology is available for dealing with traits. We can, for example, talk about a student's profile distance from college A and college B mean profiles and this might help explain why the student transferred from college A to college B. Of course, attempting to locate every institution in an N-dimensional space is a vast empirical undertaking. However, a trait representation of institutions similar to Astin's has so many more advantages over a taxonomy approach that further steps should be taken along these lines. The next section of this chapter represents one such step.

Differences among Colleges

The analyses reported in the following pages identify the dimensions along which institutions differed in terms of the attributes of the students attending those institutions. These analyses concern student differences among 28 private, coeducational, four-year colleges with spring 1964 enrollments of 5,000 or more. Table 6-1 lists the institutions included for analysis and the number of males in our sample from that institution. (All such institutions with 10 or more were included.)

The predictor attributes of the 674 male students were determined in the school testing in the spring of 1960 when they were eleventh graders. The criterion information--that is, the institution entered--was determined from the mailed follow-up studies of the students after completion of one year of college. Thus, the criterion was based on the students who entered the institution and survived the first year rather than the students who stayed there and eventually graduated.

Table 6-1

Private Coeducational Four-Year Colleges
(Enrollment of 5,000 or more)

		Number of Males in Sub-sample
1.	Boston University	17
2.	Bradley University	11
3.	Carnegie Institute of Technology	18
4.	Columbia University	17
5.	Cornell University	48
6.	Drake University	13
7.	Drexel Institute of Technology	11
8.	Duke University	21
9.	Fairleigh Dickinson University	20
10.	George Washington University	10
11.	University of Hartford	17
12.	Hofstra University	10
13.	Long Island University	56
14.	Massachusetts Institute of Technology	24
15	University of Miami, Florida	12
16.	New York University	47
17.	Northeastern University	66
18.	Northwestern University	20
19.	Pace University	20
20.	University of Pennsylvania	15
21.	University of Pittsburgh	26
22.	Polytechnic Institute of Brooklyn	23
23.	University of Rochester	17
24.	Stanford University	17
25.	Syracuse University	23
26.	Temple University	28
27.	Washington University (St. Louis)	50
28.	Western Reserve University	17
	TOTAL	674

Because a great deal of transferring takes place during the first two years of college, these analyses were highly exploratory. Our five-year follow-up data now being collected will be the basis for the actual analyses upon which a systematic description of institutions can be based. We can then talk about the types of students who survive and graduate in each of these institutions. However, it seemed profitable to begin to explore this question since each data analysis does suggest some new approach for subsequent analyses.

Thirty variables of student attributes based on 1960 test data were used. There were 10 variables from each of the three domains--ability, interest, and temperament. The 30 variables are listed in Table 6-2. The middle column of Table 6-2 lists the F ratios for each of the variables. The F ratios indicate the relative extent to which each variable produces differences among the colleges as compared to variation within the colleges. Thus, for example, our verbal and quantitative composites were by far the best predictors of choice of college. That is, these 28 institutions differed most on these two dimensions. You can also notice that the F ratios for the abilities data were in general larger than those for interests and far larger than those for any temperament dimension. That is, the colleges differed more in terms of abilities than in terms of interests, and least in terms of temperament of the students, insofar as TALENT measures of these attributes are concerned. Also listed there are the two institutions with the highest scores on each of the variables. No institutions are listed with F ratios smaller than 1.40, since these were not even significant at the .05 level.

Although Table 6-2 does give some idea of the extent to which different types of variables were able to distinguish among the students attending 28 colleges, some words of caution are necessary. We cannot say, for example, that temperament was not as important as interests in college selection, but simply that our measures of temperament did not exhibit college differences as large as the interest scales. Our interest measures were probably more reliable than our temperament measures and so interest scales tended to have less error variance and

Table 6-2

Univariate F Ratios
Corresponding to Differences among Colleges

Abilities	F ratio[a]	High Colleges
R-104 Music Information	5.24	Rochester, MIT
R-105 Social Studies Info	5.35	Penn, MIT
R-107 Physical Science	7.84	MIT, Columbia
R-115 Sports Information	4.99	Stanford, Northwestern
R-260 Creativity	4.66	MIT, Rochester
R-270 Mechanical Reas.	5.84	MIT, Drexel
R-290 Abstract Reasoning	3.07	MIT, Stanford
C-003 Verbal Composite	13.63	MIT, Stanford
C-004 Quantitative Comp.	14.72	MIT, Columbia
P*801 Socioeconomic	6.54	Penn, Stanford
Interests		
P-701 Physical Science	4.46	MIT, Columbia
P-702 Biological Science	1.71	Western Reserve, Columbia
P-703 Public Service	.77	
P-704 Literary-Linguistic	2.28	Columbia, Penn
P-705 Social Service	1.16	
P-706 Artistic	1.54	
P-708 Sports	1.83	Miami, Stanford
P-710 Business Management	1.40	
P-712 Computation	2.04	Boston, Penn
P-714 Mechanical-Tech.	2.59	Drexel, Hartford
Temperament		
R-601 Sociability	1.42	Pace, Hofstra
R-602 Social Sensitivity	1.25	
R-603 Impulsiveness	1.05	
R-604 Vigor	1.05	
R-605 Calmness	1.15	
R-606 Tidiness	.67	
R-607 Culture	1.31	
R-608 Leadership	1.27	
R-609 Self-Confidence	.98	
R-610 Mature	1.88	Rochester, Columbia

[a] ndf are 27 and 646 for all F ratios reported here.

therefore larger F ratios. The two high colleges are listed in order to illustrate the sort of institution which is at the high end of each scale. This does not mean that a third institution was not almost as high as the two listed, nor does it mean that the two institutions listed had the same or similar means.

Because the samples for each school were rather small, we cannot place too much confidence in small differences among the 840 means which resulted from an analysis of 28 institutions on 30 variables. Therefore, these 840 means are not listed for the reader's consideration. However, we do feel that discriminant functions--certainly the largest discriminant function from each of the three domains--were fairly indicative of the general nature of the differences among students entering these institutions. That is, we cannot conclude that the students at Bradley did a little better than the students at Temple on Sports Information. We can, however, talk about the major dimensions along which colleges differed and in addition list the approximate locations of the colleges on these dimensions to further illustrate the nature of these dimensions.

The 10 ability measures produced a major discriminant function which primarily utilized the verbal and quantitative composites (Table 6-3). These two variables are roughly equivalent to the College Board's SAT verbal and SAT quantitative. Thus the primary differences among the 28 institutions were in terms of general academic aptitude with three other scales--Sports Information, Mechanical Reasoning Ability, and Socioeconomic Environment--also contributing to the discrimination. Variables not listed there had discriminant function coefficients less than .15. The mean discriminant scores for the 28 colleges give an approximate location of the institution along the ability function.

The discriminant function located in the 10-dimensional interest space is described in Table 6-4. Here we see the Physical Science Interest scale as the predominant differentiator among the 28 institutions. Also included is the scale reflecting interest in literary-linguistic areas with the biological and medical sciences acting as a suppressor variable. Finally, turning to Table 6-5, we have the major discriminant function resulting from the analysis of the 10 temperament

Table 6-3

Ability Discrim Function

Discrim Score Mean	
106	MIT
105	
105	
103	Columbia, Penn, Stanford
102	Rochester
101	Cornell
100	Duke
99	Northwestern, Western Reserve
98	
97	
96	Washington
95	Carnegie, Drexel
94	
93	Boston
92	George Washington, Northeastern, Pitt, Polytechnic
91	Drake, Syracuse
90	
89	Bradley
88	Hofstra, NYU, Temple
87	
86	
85	Miami
84	Fairleigh Dickinson, Long Island
83	Hartford
82	
81	
80	
79	Pace

Scaled Weights	
.6	C-003 Verbal Comp., C-004 Quantitative Comp.
.5	
.4	
.3	R-115 Sports, R-270 Mech. Reas., P*801 Socioeconomic
.2	
.1	
.0	

Table 6-4

Interest Discrim Function

Discrim Score Mean	
17	MIT
16	
15	
14	Polytechnic
13	Columbia, Drexel
12	Duke
11	Carnegie, Rochester
10	Bradley, Northeastern, Stanford
9	Cornell
8	Fairleigh Dickinson, George Washington, Northwestern Washington, Western Reserve
7	Boston, New York, Penn
6	Drake, Hartford, Pitt, Temple
5	Long Island, Syracuse
4	Miami
3	Hofstra, Pace

Scaled Weights	
.8	P-701 Physical Sciences
.7	
.6	
.5	
.4	P-704 Literature-Linguistics
.3	
.2	
.1	
.0	
-.1	
-.2	
-.3	Biological-Medical Sciences

Table 6-5

Temperament Discrim Function

Discrim Score Mean	
4.5	MIT
4.0	
3.5	
3.0	
2.5	Columbia, Duke, Rochester
2.0	Carnegie, Northwestern, Stanford
1.5	Boston, Cornell, Penn, Polytechnic, Washington
1.0	Bradley, Drexel, Fairleigh Dickinson, George Washington Western Reserve
0.5	Hartford, Miami, New York, Northeastern, Pitt, Syracuse
0.0	Pace, Temple
-0.5	Drake
-1.0	Hofstra, Long Island

Scaled Weights	
.6	R-610 Mature Personality
.5	
.4	R-605 Calmness
.3	
.2	R-609 Self-Confidence
.1	
0	
-.1	
-.2	R-602 Social Sensitivity
-.3	
-.4	R-606 Tidiness
-.5	R-601 Sociability

measures. Notice that in each domain, students attending Massachusetts Institute of Technology represented the group most easily separated from the others. At least our small sample of this institution indicated the unique characteristics of the students entering that institution.

In order to further illustrate the types of analyses which are possible with a multivariate trait approach to the study of colleges, the Mahalanobis distances among the 28 colleges in each of the three 10-dimensional spaces were computed. Table 6-6 presents these D^2 distances for the 10-dimensional ability space. These were rounded off to the nearest whole number to simplify presentation and interpretation. The numbers across the top of each column correspond to the numbers associated with each college row. For example, the first column and the first row correspond to Boston University. Reading down column 1 we find that the students of Boston University were, in general, most similar in ability to the students of New York University and Washington University. They were least like the students attending the Massachusetts Institute of Technology. To indicate those institutions which were most similar we have placed an asterisk where the distance was less than 1. A four or five is a very large distance and this indicates that the institutions corresponding to that row and column were very dissimilar in terms of general ability patterns of the students attending. Table 6-7 presents this same information for interest and Table 6-8 for the activities--temperament dimensions. For example, the students attending George Washington University were most like the students attending the University of Pittsburgh in ability, but the George Washington students more closely resembled the students at Cornell and Temple in interests, and the students at Northwestern and Washington Universitites in temperament.

This D^2 approach does allow one to arrive at an empirical basis for a taxonomy by forming clusters out of institutions which have small D^2 values. The problem, of course, is that such an empirical clustering would depend upon the types of variables which were used in the computation of the D^2. Also, if one were to pool all the information, one would have clustering which might be a function of too many things.

Table 6-6

Abilities

Distances (D^2) between College Pairs

	College	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	Boston	0	2	2	3	2	3	3	2	2	2	3	2	2	4	3	1	2	2	2	3	2	2	3	3	2	2	1	2
2	Bradley	2	0	2	4	2	1	2	3	1	1	2	2	1	4	2	2	1	3	2	5	1	2	5	4	1	2	2	3
3	Carnegie	2	2	0	1	1	1	2	2	2	2	1	1	2	1	2	1	1	1	2	2	1	1	1	2	*	2	*	*
4	Columbia	3	4	1	0	1	3	3	2	3	3	4	5	3	1	4	2	2	1	4	2	2	3	1	2	3	2	1	1
5	Cornell	2	2	1	1	0	2	2	1	3	1	3	3	3	1	3	2	2	1	3	1	1	2	*	1	2	2	1	*
6	Drake	3	1	1	3	2	0	3	3	1	2	2	1	2	5	3	2	2	2	2	3	1	3	3	3	1	2	2	2
7	Drexel	3	2	2	3	2	3	0	3	2	2	3	4	3	4	4	3	2	3	2	4	2	2	2	4	2	2	2	2
8	Duke	2	3	2	2	1	3	3	0	3	3	4	4	2	2	3	2	2	2	3	2	2	3	1	2	2	3	2	1
9	Fairleigh	2	1	2	3	3	1	2	3	0	2	*	1	*	5	2	1	1	3	1	4	2	2	3	4	1	1	2	3
10	G. Wash.	2	1	2	3	1	2	2	3	2	0	3	3	2	3	2	2	1	2	2	2	*	2	2	3	1	2	1	1
11	Hartford	3	2	1	4	3	2	3	4	*	3	0	1	*	4	3	1	2	3	1	4	2	2	3	4	1	2	2	3
12	Hofstra	2	2	1	5	3	1	4	4	1	3	1	0	*	6	2	1	2	2	2	5	1	3	4	4	1	2	1	2
13	Long Island	2	1	2	3	3	2	3	2	*	2	*	*	0	4	2	*	2	2	*	3	1	2	3	3	1	1	2	2
14	MIT	4	4	1	1	1	5	4	2	5	3	4	6	4	0	5	3	3	2	4	2	3	3	2	2	3	3	1	3
15	Miami	3	2	2	4	3	3	4	3	2	2	3	2	2	5	0	2	2	3	2	4	2	3	4	4	2	3	2	3
16	New York	1	2	1	2	2	2	3	2	1	2	1	1	*	3	2	0	1	2	1	2	1	1	2	2	*	1	1	2
17	Northeast.	2	1	1	2	2	2	2	2	1	1	2	2	2	3	2	1	0	2	2	3	1	1	2	2	*	1	1	1
18	Northwest.	2	3	1	1	1	2	3	2	3	2	3	2	2	2	3	2	2	0	3	1	1	3	1	1	2	2	*	1
19	Pace	2	2	2	4	3	2	2	3	1	2	1	2	*	4	2	1	2	3	0	4	2	2	4	5	2	1	2	3
20	Penn	3	5	2	2	1	3	4	2	4	2	4	5	3	2	4	2	3	1	4	0	2	3	2	1	3	3	1	2
21	Pitt	2	1	1	2	1	1	2	2	2	*	2	1	1	3	2	1	1	1	2	2	0	2	2	2	*	1	1	1
22	Polytechnic	2	2	1	3	2	3	2	3	2	2	2	3	2	3	3	1	1	3	2	3	2	0	3	4	2	2	2	2
23	Rochester	3	5	1	1	*	3	2	1	3	2	3	4	3	2	4	2	2	1	4	2	2	3	0	1	2	2	1	2
24	Stanford	3	4	2	2	1	3	4	2	4	3	4	4	3	2	4	2	2	1	5	1	2	4	1	0	3	3	1	2
25	Syracuse	2	1	*	3	2	1	2	2	1	1	1	1	1	3	2	*	*	2	2	3	*	2	2	3	0	1	1	1
26	Temple	2	2	2	2	2	2	2	3	1	2	2	2	1	3	3	1	1	2	1	3	1	2	2	3	1	0	1	2
27	Washington	1	2	*	1	1	2	2	2	2	1	2	1	2	1	2	1	1	*	2	1	1	2	1	1	1	1	0	*
28	West. Res.	2	3	*	1	*	2	2	1	3	1	3	2	2	3	3	2	1	1	3	2	1	2	2	2	1	2	*	0

* Indicates D^2 was less than 1.000. All other values rounded to nearest whole number.

Table 6-7

Interests

Distances (D^2) between College Pairs

	College	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	Boston	0	2	2	2	1	1	2	2	2	2	1	2	1	3	2	1	1	1	1	1	1	2	1	2	1	1	1	*
2	Bradley	2	0	2	3	1	3	3	2	1	2	2	4	2	2	2	2	1	2	2	4	2	2	2	3	2	2	1	2
3	Carnegie	2	2	0	2	1	2	1	1	1	2	2	2	2	2	2	1	1	2	2	3	2	1	1	2	2	2	1	2
4	Columbia	2	3	2	0	1	2	2	2	2	2	2	3	3	1	2	1	1	1	3	2	2	2	1	1	2	2	1	2
5	Cornell	1	1	1	1	0	1	2	*	*	*	1	2	*	2	1	*	*	1	1	2	*	2	*	1	*	*	*	1
6	Drake	1	3	2	2	1	0	2	2	2	2	2	2	1	3	2	1	1	1	2	2	1	2	2	1	2	1	1	1
7	Drexel	2	3	1	2	2	2	0	2	2	2	2	5	2	2	3	2	1	2	3	2	2	1	1	2	2	2	2	2
8	Duke	2	2	1	2	*	2	2	0	2	1	2	2	2	2	4	1	*	2	2	2	1	2	*	2	1	2	1	2
9	Fairleigh	2	1	1	2	*	2	2	2	0	2	*	1	*	3	1	*	1	2	2	2	1	2	2	2	*	1	1	2
10	G. Wash.	2	2	2	2	*	2	2	1	2	0	2	2	2	3	3	1	1	2	2	2	2	2	1	1	1	*	1	2
11	Hartford	1	2	2	2	1	2	2	2	*	2	0	2	1	3	*	1	1	1	1	3	1	2	2	2	1	1	1	2
12	Hofstra	2	4	2	3	2	2	5	2	1	2	2	0	*	4	3	*	2	3	2	3	1	3	2	2	1	1	1	2
13	Long Island	1	2	2	3	*	1	2	2	*	2	1	*	0	3	1	*	1	1	1	2	*	2	2	2	*	1	1	1
14	MIT	3	2	2	1	2	3	2	2	3	3	3	4	3	0	4	2	2	2	4	3	3	1	1	2	2	3	2	3
15	Miami	2	2	2	2	1	2	3	4	1	3	*	3	1	4	0	1	2	1	2	5	1	3	3	2	1	1	1	2
16	New York	1	2	1	1	*	1	2	1	*	1	1	*	*	2	1	0	1	1	1	2	*	2	1	1	*	*	*	1
17	Northeast.	1	1	1	1	*	1	1	*	1	1	1	2	1	2	2	1	0	1	1	2	*	1	1	1	1	1	*	1
18	Northwest.	1	2	2	1	1	1	2	2	2	2	1	3	1	2	1	1	1	0	2	3	*	2	2	1	1	1	*	2
19	Pace	1	2	2	3	1	2	3	2	2	2	1	2	1	4	2	1	1	2	0	2	1	3	2	2	1	1	2	2
20	Penn	1	4	3	2	2	2	2	2	2	2	3	3	2	3	5	2	2	3	2	0	2	3	2	2	3	1	2	1
21	Pitt	1	2	2	2	*	1	2	1	1	2	1	1	*	3	1	*	*	*	1	2	0	2	1	2	*	1	*	1
22	Polytechnic	2	2	1	2	2	2	1	2	2	2	2	3	2	1	3	2	1	2	3	3	2	0	*	2	2	2	1	2
23	Rochester	1	2	1	1	*	2	1	*	2	1	2	2	2	1	3	1	1	2	2	2	1	*	0	*	2	1	*	1
24	Stanford	2	3	2	1	1	1	2	2	2	1	2	2	2	2	2	1	1	1	2	2	2	2	*	0	2	1	*	2
25	Syracuse	1	2	2	2	*	2	2	1	*	1	1	1	*	2	1	*	1	1	1	3	*	2	2	2	0	1	*	1
26	Temple	1	2	2	2	*	1	2	2	1	*	1	1	1	3	1	*	1	1	1	1	1	2	1	1	1	0	1	1
27	Washington	1	1	1	1	*	1	2	1	1	1	1	1	1	2	1	*	*	*	2	2	*	1	*	*	*	1	0	1
28	West. Res.	*	2	2	2	1	1	2	2	2	2	2	2	1	3	2	1	1	2	2	1	1	2	1	2	1	1	1	0

* Indicates D^2 was less than 1.000. All other values rounded to nearest whole number.

Table 6-8

Activities

Distances (D^2) between College Pairs

	College	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	Boston	0	2	2	2	*	1	2	*	2	2	1	2	*	1	1	1	*	1	1	*	1	*	1	1	1	1	1	*
2	Bradley	2	0	2	2	1	2	3	2	1	2	1	2	*	2	2	1	1	1	*	1	1	1	2	1	1	2	1	1
3	Carnegie	2	2	0	*	*	2	2	2	1	2	2	2	1	2	2	1	1	2	2	*	1	1	1	2	1	1	1	1
4	Columbia	2	2	*	0	1	2	1	1	2	2	1	2	1	2	2	1	1	2	2	1	1	2	*	2	1	1	1	1
5	Cornell	*	1	*	1	0	1	2	*	*	1	1	2	*	2	1	1	*	*	1	*	1	*	*	*	*	*	*	*
6	Drake	1	2	2	2	1	0	2	1	1	2	*	3	*	2	1	*	*	2	1	1	1	1	2	1	*	1	1	1
7	Drexel	2	3	2	1	2	2	0	2	2	4	1	4	1	2	2	1	1	2	2	2	2	2	2	2	2	1	2	1
8	Duke	*	2	2	1	*	1	2	0	1	2	1	2	1	2	2	1	1	2	2	*	2	1	1	1	2	2	1	2
9	Fairleigh	2	1	1	2	*	1	2	1	0	1	1	2	*	2	2	*	*	1	1	1	1	*	2	1	*	1	*	1
10	G. Wash.	2	2	2	2	1	2	4	2	1	0	2	2	1	2	2	1	1	*	1	2	1	2	2	2	2	1	*	2
11	Hartford	1	1	2	1	1	*	1	1	1	2	0	2	*	2	1	*	*	2	1	1	1	1	2	1	1	*	1	2
12	Hofstra	2	2	2	2	2	3	4	2	2	2	2	0	1	3	4	1	1	2	2	2	1	2	2	2	1	2	2	2
13	Long Island	*	*	1	1	*	*	1	1	*	1	*	1	0	2	1	*	*	1	*	*	1	*	2	1	*	1	*	1
14	MIT	1	2	2	2	2	2	2	2	2	2	2	3	2	0	2	2	2	2	3	2	2	1	2	2	2	2	2	2
15	Miami	1	2	2	2	1	1	2	2	2	2	1	4	1	2	0	1	1	1	1	2	1	2	2	2	1	1	1	2
16	New York	1	1	1	1	1	*	1	1	*	1	*	1	*	2	1	0	*	1	*	1	*	*	2	1	*	*	1	*
17	Northeast.	*	1	1	1	*	*	1	1	*	1	*	1	*	2	1	*	0	1	*	*	*	*	1	*	*	*	*	*
18	Northwest.	1	1	2	2	*	2	2	2	1	*	2	2	1	2	1	1	1	0	1	1	1	1	1	1	2	1	*	1
19	Pace	1	*	2	2	1	1	2	2	1	1	1	2	*	3	1	*	*	1	0	1	*	1	2	1	*	*	*	1
20	Penn	*	1	*	1	*	1	2	*	1	2	1	2	*	2	2	1	*	1	1	0	1	*	2	1	1	1	1	1
21	Pitt	1	1	1	1	1	1	2	2	1	1	1	1	1	2	1	*	*	1	*	1	0	*	1	1	*	*	1	*
22	Polytechnic	*	1	1	2	*	1	2	1	*	2	1	2	*	1	2	*	*	1	1	*	*	0	1	1	1	1	1	*
23	Rochester	1	2	1	*	*	2	2	1	2	2	2	2	2	2	2	2	1	1	2	2	1	1	0	*	1	1	1	*
24	Stanford	1	1	2	2	*	1	2	1	1	2	1	2	1	2	2	1	*	1	1	1	1	1	*	0	1	1	*	1
25	Syracuse	1	1	1	1	*	*	2	2	*	2	1	1	*	2	1	*	*	2	*	1	*	1	1	1	0	*	1	*
26	Temple	1	2	1	1	*	1	1	2	1	1	*	2	1	2	1	*	*	1	*	1	*	1	1	1	*	0	1	1
27	Washington	1	1	1	1	*	1	2	1	*	*	1	2	*	2	1	1	*	*	*	1	1	1	1	*	1	1	0	1
28	West. Res.	*	1	1	1	*	1	1	2	1	2	2	2	1	2	2	*	*	1	1	1	*	*	*	1	*	1	1	0

* Indicates D^2 was less than 1.000. All other values rounded to nearest whole number.

At this stage it seems to us that a dimensional scheme based on college locations along functions of maximum differences cross-validated with other age groups would be a more reasonable approach than the D^2 approach of attempting to arrive at clusters of institutions having similar types of students.

Sex Differences among Colleges. Since the above analyses were based upon males, it seemed reasonable to ask whether or not similar trends would be observed from female data. One approach would have been to repeat the analyses using the data from our eleventh-grade girls. However, the results would have been difficult to talk about since we would have had no good basis for asking whether there were significant differences between the results of the male discriminant analysis and the results of the female discriminant analysis. Therefore, a multivariate analysis of variance approach, which allowed us to consider both sex and college simultaneously in a two-factor design, was used to answer the research question, "Do the relative differences among colleges depend upon which sex you are talking about?"

Using all of the 30 variables that were used in the previous college analyses and 17 of the 28 colleges for which we had 10 or more females, we conducted a multivariate analysis of variance in a sex by college design (2 x 17). No significant college-sex interactions were found. The F ratio for the likelihood ratio criterion for interaction was 1.10 with 480 and 10,000 degrees of freedom. Therefore, the relative differences among the colleges do not depend upon which sex you are talking about. Of course there were significant sex differences within colleges, but the general nature of the sex differences did not vary from college to college.

Comparison with Astin's Results. In order to check on the comparability of certain of our scales with those of Astin (1965) in his study, Who Goes Where to College, we correlated two of Astin's college indices, intellectualism and status, with three of our college indices, discriminant score on the ability discriminant function, socioeconomic status, and verbal composite. The intercorrelations among these five variables are presented in Table 6-9. Our ability discriminant function correlated with Astin's intellectualism .75. The verbal composite C-003 correlated with Astin's intellectualism .69. Our socioeconomic index correlated .61 with Astin's status dimension, but the latter is much more independent of ability than is ours (as can be seen in column 4 of that matrix). Since these correlations were between college mean scores, they were higher than would be obtained using the student as the unit of analysis. However, the correlation of .75 between Astin's intellectualism and our ability discriminant function is indeed encouraging. It suggests that the estimates based on the Project TALENT samples, which were much smaller than those used by Astin, are fairly accurate estimates of undergraduate populations.

Table 6-9

Comparison with Astin's Results

		1	2	3	4	5
1.	Intellectualism (Astin)	1.00	.27	.75	.53	.69
2.	Status (Astin)	.27	1.00	.36	.61	.31
3.	Ability Discrim (TALENT)	.75	.36	1.00	.65	.98
4.	P*801 (TALENT)	.53	.61	.65	1.00	.56
5.	Verbal Composite (TALENT)	.69	.31	.98	.56	1.00

[a] Intercorrelations are among two college indices reported by Astin (1965) and college means on three TALENT variables. Results are based upon 27 colleges (Astin data not available for the University of Hartford).

College Major Differences[1]

Just as different institutions attract students with differing attributes, different college major fields attract different kinds of students. This section of Chapter 6 will consider some of these major field differences. The proportions of students majoring in various subject matter areas have already been discussed in Chapter 3. The emphasis in this section is on describing the students enrolled in these different college majors in terms of the TALENT battery. The subjects used in the following analyses were respondents to the one-year follow-up questionnaire (students in their second year of college) who took the Project TALENT battery while high-school tenth graders. The college major groups used in this study are listed in Table 6-10. Separate analyses were done for males and females.

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[1] This section was based upon analyses conducted by Dr. Richard Holdeman.

The predictor variables used in the male study are listed in Table 6-11, along with the groups having the highest and lowest means. The univariate F ratios, also listed there, indicate the relative predictive validities of the 20 variables. Table 6-12 repeats this same information for the females.

In general, the group means were very consistent with one's expectations. For example, the English majors were highest on Literature Information and Literary-Linguistic Interest with the math and physical science majors highest on Math Information, Math Total, and Physical Science-Math Interest. The male agriculture majors, lowest on most variables, had the highest group mean on the Farming Information scale, and the business and biological science majors, similarly, had the highest mean scores on the Business Management Interest and the Biological Science and Medicine Interest scales, respectively. Girls majoring in nursing curriculums scored extremely low on the Public Service Interest scale. However, this scale does not reflect interest in social or personal service--qualities assumed of those in nursing--but interest in governmental service and related activities.

The F ratios in the two tables indicate that the differences among the male major groups tended to be greater than among the female groups. The best single predictor (highest F ratio) for the males was Physical Science Interest. Mathematics Information did the best job of separating the ten female major groups. The four Student Information Blank (SIB)

Table 6-10

College Major Groups Used in Analyses

	Males	N
1.	Mathematics	409
2.	Physical Science	489
3.	Biological Science	607
4.	Social Studies	1083
5.	English and Literature	254
6.	Languages and Fine Arts	302
7.	Psychology	259
8.	Education	225
9.	Engineering	1146
10.	Business	1457
11.	Agriculture and Forestry	227

	Females	N
1.	Math and Physical Science	488
2.	Biological Science	402
3.	Social Studies	942
4.	English	877
5.	Languages and Fine Arts	908
6.	Psychology	371
7.	Education	1917
8.	Business	837
9.	Home Economics	357
10.	Nursing	500

Table 6-11

High and Low Male College Majors on Selected Variables

Predictor Variable		Highest Group Mean	Lowest Group Mean	F Ratio (ndf = 10 and 2189)
R-102	Vocabulary Info	English	Ag. and Forestry	23.88
R-103	Literature Info	English	Ag. and Forestry	29.51
R-104	Music Info	English	Ag. and Forestry	23.59
R-106	Math Info	Physical Science	Ag. and Forestry	30.52
R-111	Electricity and Electronics Info	Physical Science	Education	16.35
R-113	Farming Info	Ag. and Forestry	Education	9.64
R-115	Sports Info	Social Studies	Ag. and Forestry	8.80
R-230	English Total	English	Ag. and Forestry	23.08
R-250	Reading Comprehension	English	Ag. and Forestry	24.81
R-340	Math Total	Physical Science	Education	28.34
P-701	Phys. Sci Engineering, Math Interest	Physical Science	Ag. and Forestry	32.83
P-702	Biological Science and Medicine Interest	Biological Science	Ag. and Forestry	25.62
P-704	Literary-Linguistic Interest	English	Ag. and Forestry	27.05
P-710	Business Management Interest	Business	Ag. and Forestry	5.24
P-714	Mechanical-Technical Interest	Engineering	English	17.58
P*801	Socioeconomic-Environmental Index	English	Ag. and Forestry	14.20
SIB-240	Expected income	Psychology	Ag. and Forestry	4.31
SIB-310	College important for Income	Business	Lang. and Arts	2.18
SIB-313	College important for Learning	Physical Science	Ag. and Forestry	3.53
SIB-316	College important for Friends	Business	Lang. and Arts	3.65

Table 6-12

High and Low Female College Majors on Selected Variables

Predictor Variable		Highest Group Mean	Lowest Group Mean	F Ratio (ndf = 9 and 1990)
R-102	Vocabulary Info	Biological Science	Business	19.22
R-103	Literature Info	English	Business	21.13
R-104	Music Info	Lang., Arts, Music	Business	15.55
R-105	Social Studies Info	Math & Physical Science	Business	18.20
R-106	Math Info	Math & Physical Science	Business	29.68
R-107	Physical Science Info	Math & Physical Science	Business	15.82
R-108	Biological Sci. Info	Biological Science	Business	16.31
R-114	Home Economics Info	Home Economics	Business	6.26
R-139	Acct., Business, Sales Info	Math & Physical Science	Business	9.10
R-230	English Total	Math & Physical Science	Business	16.96
R-282	Visualization in 3 Dimensions	Math & Physical Science	Business	10.00
R-340	Math Total	Math & Physical Science	Business	26.63
P-701	Phys. Sci., Math, Engineering Interest	Math & Physical Science	Business	23.38
P-702	Biological Science, and Medicine Interest	Biological Science	Business	29.03
P-703	Public Service Interest	Social Studies	Home Economics	5.92
P-704	Literary-Linguistic Interest	English	Business	15.02
P-705	Social Service Interest	Education	Lang., Arts, Music	6.67
P-706	Artistic Interest	Lang., Arts, Music	Business	11.17
P-710	Business Management Interest	Social Studies	Nursing	4.82
P*801	Socioeconomic-Environmental Index	Social Studies	Business	11.08

items which were used in the male analysis were not particularly good predictors. This was in part due to the lower reliability of single items of this type.

The basic differences among college major groups can be summarized by the largest two discriminant functions resulting from discriminant analyses of the groups using the twenty predictors listed in Tables 6-11 and 6-12. The group centroids are plotted in Figures 6-1 and 6-2. The first two discriminant functions accounted for about 60 per cent of the variance for females and about 70 per cent for the males. The variables making the largest contribution on each discriminant function (highest scaled vector weights) are listed along the axes in Figures 6-1 and 6-2. The variables contributing most heavily to each discriminant function were the interest scales. Math Total, Math Information, Literature Information, Home Economics Information, Farming Information, and Reading Comprehension also made useful contributions. SIB items dealing with the importance of money and reasons for attending college made little contribution; however, socioeconomic background was of some importance for the females.

A more accurate picture of group profile differences can be obtained from the Mahalanobis D square matrices of Table 6-13. As noted in the table, all groups except two were significantly different. The only groups not different were the social studies and psychology majors. This occurred in both the male and the female analyses. History, government, political science, civics, economics, geography, sociology, etc., were areas listed as possible social studies majors, so it should not be too surprising to find that psychology majors could not be differentiated from this group. The distances among the mathematics, physical science, and biological science majors for males were all significantly different from zero.

Summary of College Student Differences

Probably the most important decision facing a senior high-school student is in regard to his plans for further education. Whether or not to go to college, what college to attend, and what to study in college

Figure 6-1

Plots of Group Centroids for Male College Majors

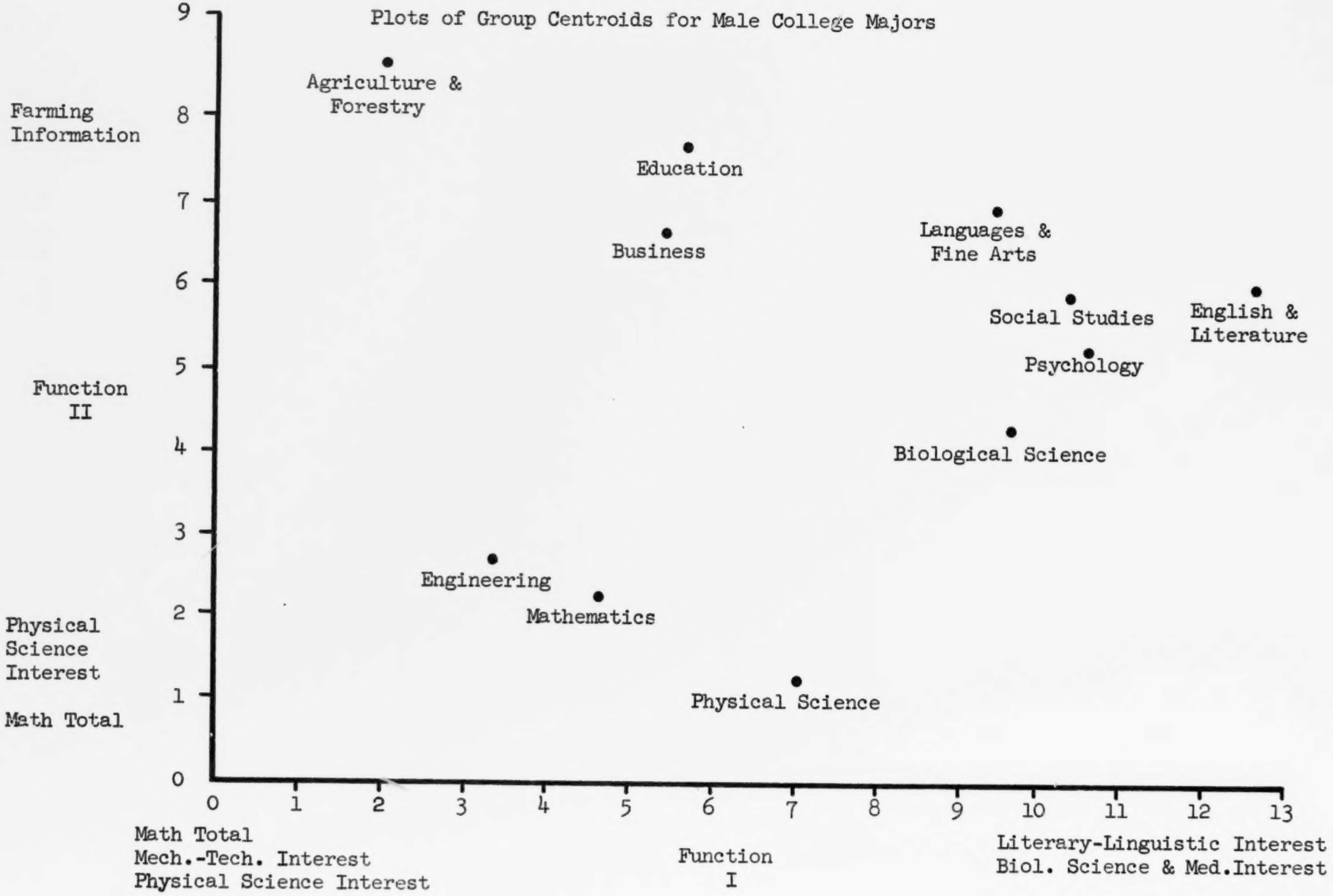

Figure 6-2

Plots of Group Centroids for Female College Majors

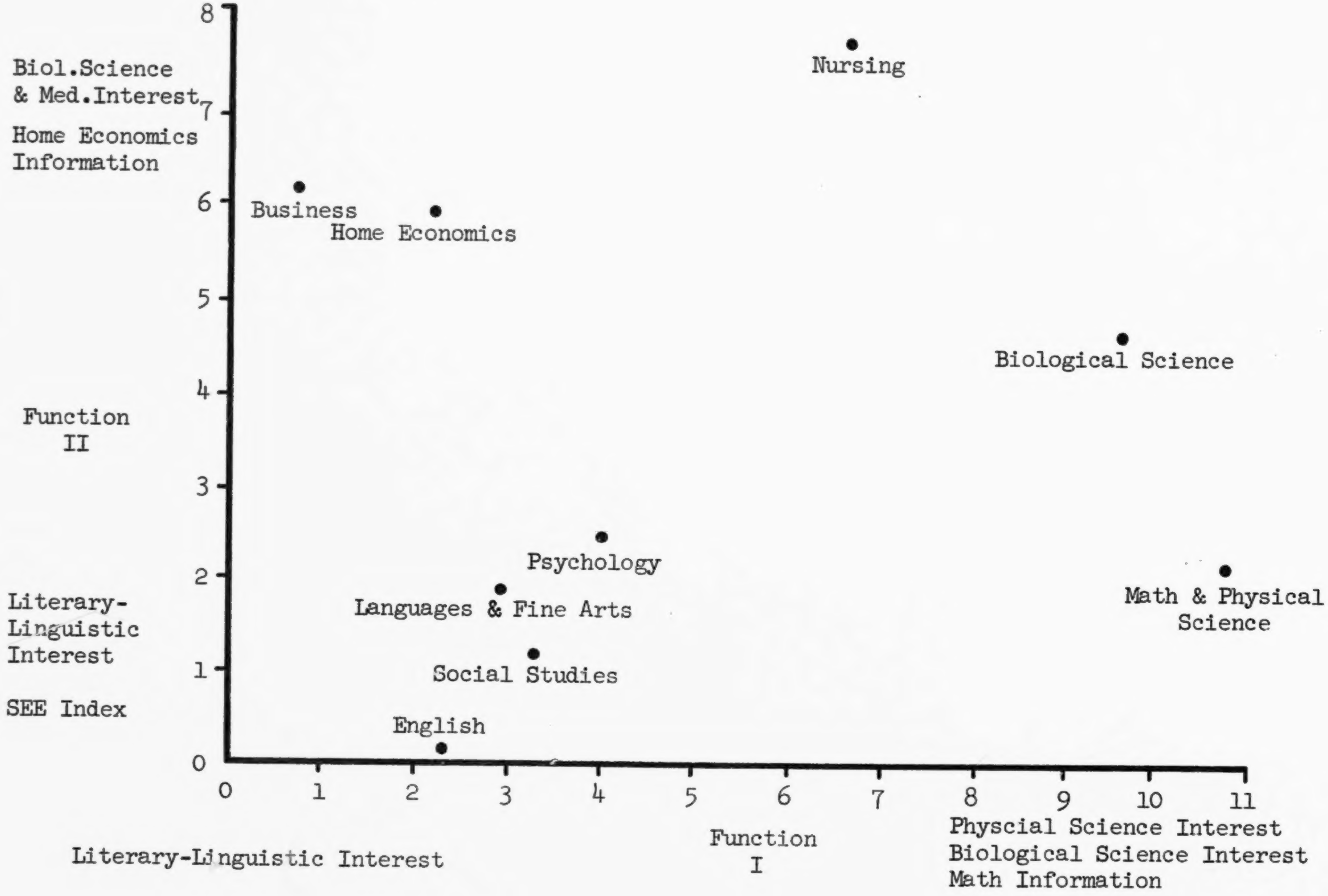

Table 6-13

Mahalanobis Distance Matrix

(Males)

	Math	Physical Science	Biological Science	Social Studies	English and Literature	Foreign Language, Fine Arts, and Music
Mathematics	.00	1.11	1.61	1.58	1.81	1.57
Physical Science	1.11	.00	.99	1.37	1.54	1.57
Biological Science	1.61	.99	.00	1.00	1.29	1.37
Social Studies	1.58	1.37	1.00	.00	.80	1.14
English & Literature	1.81	1.54	1.29	.80	.00	.95
Lang., Arts, Music	1.57	1.57	1.37	1.14	.95	.00
Psychology	1.58	1.16	.73	.61[a]	.77	.93
Education	1.53	1.69	1.35	1.18	1.52	1.15
Engineering	.91	1.05	1.59	1.65	1.87	1.59
Business	1.33	1.55	1.43	1.08	1.52	1.28
Ag. and Forestry	1.84	1.88	1.78	1.83	2.17	1.69

	Psychology	Education	Engineering	Business	Agriculture and Forestry
Mathematics	1.58	1.53	.91	1.33	1.84
Physical Science	1.16	1.69	1.05	1.55	1.88
Biological Science	.73	1.35	1.59	1.43	1.78
Social Studies	.61[a]	1.18	1.65	1.08	1.83
English & Literature	.77	1.52	1.87	1.52	2.17
Lang., Arts, Music	.93	1.15	1.59	1.28	1.69
Psychology	.00	1.90	1.51	1.20	1.77
Education	1.09	.00	1.54	.72	1.16
Engineering	1.51	1.54	.00	1.34	1.64
Business	1.20	.72	1.34	.00	1.24
Ag. and Forestry	.77	1.16	1.64	1.24	.00

[a] Group profile differences not significant at .01 level (all other values significant).

Table 6-13 (cont.)

Mahalanobis Distance Matrix

(Females)

	Math and Physical Science	Biological Science	Social Studies	English	Foreign Language, Fine Arts, and Music
Math and Phys. Science	.00	1.31	1.50	1.75	1.67
Biological Science	1.31	.00	1.34	1.46	1.32
Social Studies	1.50	1.34	.00	.80	.90
English	1.75	1.46	.80	.00	.88
Lang., Arts, Music	1.67	1.32	.90	.88	.00
Psychology	1.36	1.15	.58[a]	.83	.93
Education	1.64	1.44	.89	1.19	1.21
Business	1.76	1.86	1.33	1.53	1.36
Home Economics	1.75	1.42	1.25	1.28	.98
Nursing	1.87	.96	1.41	1.54	1.51

	Psychology	Education	Business	Home Economics	Nursing
Math and Phys. Science	1.36	1.64	1.76	1.75	1.87
Biological Science	1.15	1.44	1.86	1.42	.96
Social Studies	.58[a]	.89	1.33	1.25	1.41
English	.83	1.19	1.53	1.28	1.54
Lang., Arts, Music	.93	1.21	1.36	.98	1.51
Psychology	.00	.87	1.12	1.09	1.26
Education	.87	.00	.95	.88	1.14
Business	1.12	.95	.00	1.01	1.55
Home Economics	1.09	.88	1.01	.00	1.20
Nursing	1.26	1.14	1.55	1.20	.00

[a] Group profile differences not significant at .01 level (all other values significant).

are very pressing concerns of American youth and their parents. This chapter has shown that Project TALENT now has data very relevant to these concerns. Our five-year follow-up data and further analyses along these lines should prove to be very useful in developing information needed for these guidance purposes.

Chapter 7

Post-High-School Work

William W. Cooley and Richard Holdeman

Maximum utilization of the nation's talent and human resources is a problem of the utmost concern. However, when we think of talent, we must consider not only the scientifically and professionally talented but the technically skilled as well--in other words, men and women who do not have high academic aptitudes but who are high in other aptitudes. In order to make the best possible use of these resources, much more information about the psychological aspects of individuals presently in nonprofessional jobs (semiskilled, skilled, and technical jobs) must be gathered, organized, and studied for intelligent insights into the vocational guidance and placement need for these nonacademically talented young people.

Chapter 3 presented data on the proportions of young people working in different job categories one year after their class graduated from high school. Those results give a rather good description of the employment of our young people because they are based upon our probability sample data, weighted to adjust for nonrespondent bias. In this chapter we have three additional concerns: (1) Are these young people planning to continue working in their present occupational areas? (2) Are the TALENT variables related to present occupational group membership? and (3) Are data available in high school (i.e., TALENT tests) capable of anticipating satisfaction in first work positions?

Occupational Group Stability

In order to examine the extent to which young men with full-time jobs were satisfied with them, we compared their present job descriptions with their career plans for the future. Table 7-1 lists 35 different occupations and the percentage in each job category who said that they planned to remain in the occupation. Two generalizations are possible from inspection of Table 7-1. The expected holding powers within specific occupations across the four grades fall within relatively narrow ranges,

Table 7-1

Career Stability of Occupational Groups (Males)

	Percentage Who Planned to Remain in First Job Field			
Occupations	Grade 12	Grade 11	Grade 10	Grade 9
Business, industry (managerial)	43	43	45	37
Technician (science, engineering)	7	12	13	12
Surveyor	7	9	18	11
Draftsman	44	30	27	34
Photographer	59	52	39	48
Technician (medical, X-ray)	11	13	39	22
Tabulating operator	27	39	36	16
Bookkeeper	9	8	8	10
Clerical (general)	4	5	5	4
Salesman	30	38	32	29
Salesclerk	6	11	5	6
Sales (routeman, door-to-door, etc.)	10	15	26	4
Armed Forces	7	11	10	10
Policeman, fireman	12	13	35	26
Electronic technician	35	39	41	36
Electrician	44	43	48	42
Machinist	27	49	48	46
Mechanic, repairman	36	43	42	39
Carpenter, cabinetmaker	20	30	32	23
Metal worker	24	31	34	27
Painter, plasterer	22	20	27	18
Plumber, pipefitter	52	36	36	33
Roadbuilder (heavy equipment operator)	8	21	19	7
Miscellaneous construction	15	11	18	8
Driver (long distance and local)	9	11	16	10
Clothing and fashion trades	15	25	17	3
Waiter, busboy	0	2	0	0
Barber, hairdresser	68	70	88	63
Baker, chef, cook	20	17	21	14
Other service workers (usher, elevator operator, dishwasher, yardman, etc.)	7	10	8	6
Farmer, ranch laborer	4	1	2	0
General laborer (unspecialized factory or assembly line)	5	8	9	7
Farm or ranch owner, manager	63	74	72	58
Outdoors (nurseryman, forester)	12	13	21	9
Printer	51	58	56	48

while the percentages vary greatly across occupations (from 0 to 88 per cent).

The occupations in which the incumbents showed the greatest career interest were among those requiring considerable training: printers, photographers, barbers, and farmers. The building trades appeared next most attractive to their members as life-long occupations: electricians, plumbers, carpenters, and painters. The next most stable groups were skilled workers, such as machinists, mechanics, and electronic technicians.

The three types of selling occupations exhibited very diverse stability indices. Salesclerks were much less likely to remain in their jobs than were salesmen. Door-to-door sales and routemen, on the other hand, did not exhibit stability across grades. Other occupations seemed to have considerably less job-holding power, such as: waiters and busboys, farm and ranch laborers, bookkeepers, general laborers (unspecialized factory and assembly-line workers), and military servicemen.

Occupational Group Differences

Because the high-school graduates completely satisfied with their present full-time employment could differ considerably from those individuals who plan to seek another career, a stratification of job categories by future career plans was considered necessary. As a result, the occupational groups used in one of the following analyses consisted of all those employed regardless of their future plans, while the groups used in the second analysis consisted of those who planned to make their present vocation their life work. In both analyses the same TALENT predictors were used. Of the original 35 career groupings, 15 occupations had enough members indicating job satisfaction to be included in the analyses. (See Table 7-2 for the specific groups used, their size, and Project TALENT variables studied.) The occupational groupings were based on responses to follow-up questionnaires administered one year after that group had graduated from high school. The sample consisted of those ninth-grade males who responded to the follow-up questionnaire mailed in the fall of 1964 indicating that they were employed full-time and not enrolled in a college.

Table 7-2

Groups and Variables Used in Job and Career Plan Analyses

	Groups	Number Employed Regardless of Career Plans	Number Employed with Identical Career Plans
1.	Business (managerial)	170	67
2.	General clerical	942	36
3.	Draftsman	68	23
4.	Salesman	76	22
5.	Electronic technician	77	28
6.	Electrician	181	79
7.	Machinist	176	83
8.	Mechanic	400	151
9.	Carpenter	142	32
10.	Metal tradesman	111	25
11.	Painter	157	26
12.	Driver	249	29
13.	Printer	115	55
14.	Laborer (unspecialized, factory)	1292	85
15.	Farmer	108	62

Variables

1. R-106 - Math Information
2. R-107 - Physical Science Information
3. R-111 - Electricity Information
4. R-112 - Mechanics Information
5. R-134 - Engineering Information
6. R-139 - Acct., Business, Sales Information
7. R-260 - Creativity
8. R-270 - Mechanical Reasoning
9. R-282 - Visualization in Three Dimensions
10. P-713 - Office Work Interest
11. P-714 - Mech-Tech Interest
12. P-716 - Farming Interest
13. P-717 - Labor Interest
14. SEE - Socioeconomic-Environmental Index

A major hypothesis here is that an individual whose TALENT profile differs from the typical profile of his group will tend to leave that group. One approach to testing this hypothesis is to examine the differences in Mahalanobis D^2 distances before and after removing from the groups those who plan to leave their respective groups. Table 7-3 presents the distances between groups based upon current jobs, while the Table 7-4 distances are between groups whose members plan to remain in those groups.

A comparison of the D^2 values in Tables 7-3 and 7-4 reveals that in only one case out of 105 was a distance between groups with the same job and career plan less than the distance between the same pair of job groups without regard to career plans. The one exception was the draftsman versus farmer group distance which was 1.50 in Table 7-3 and 1.34 in Table 7-4. Since occupational-group differentiation is improved when future career plans are considered, it clearly indicates that those planning to leave tend not to resemble the typical members of that group.[1]

Another useful feature of the D^2 technique is that the overall statistical significance of profile differences can be determined for group pairs. All but nine of the 105 D^2 values of Table 7-4 (groups with identical job-career plans) were significant at the .05 level. Four of the nine insignificant ones were associated with the salesman group. This was largely due to the small number who wanted to remain salesmen, thus lowering the degrees of freedom available for comparisons with that group. In general, we can say that each of these 15 groups had a distinctively different profile for the 14 variables considered here.

Figures 7-1 and 7-2 are profiles of group means for selected groups. Each of the three profiles in each graph was significantly different from the other two. In Figure 7-1 the businessman and mechanic profiles appear to be similar since eight of the 14 mean scores for these two groups were nearly identical; however, when considering the remaining six mean scores and the complete profiles, these groups were found to be significantly

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[1] It perhaps should be pointed out to some readers that D^2 will increase with decreasing within-group variance even if group means do not move apart. Our point is made, however, by increased D^2 regardless of cause.

Table 7-3

Mahalanobis Distance Matrix for Occupational Groups without Regard to Career Plans

	1	2	3	4	5	6	7	8
1. Businessman	.00	.39	.57	.47	.98	.58	.78	.67
2. Clerical worker	.39	.00	.74	.50	1.21	.76	.89	.83
3. Draftsman	.57	.74	.00	.78	.89	.78	1.20	.96
4. Salesman	.47	.50	.78	.00	1.17	.64	.83	.69
5. Electronic technician	.98	1.21	.89	1.17	.00	.77	1.05	1.03
6. Electrician	.58	.76	.78	.64	.77	.00	.48	.40
7. Machinist	.78	.89	1.20	.83	1.05	.48	.00	.37
8. Mechanic	.67	.83	.96	.69	1.03	.40	.37	.00
9. Carpenter	.66	.66	.91	.67	1.16	.61	.64	.59
10. Metal worker	.61	.58	.89	.74	1.13	.57	.63	.51
11. Painter	.78	.70	1.08	.72	1.33	.67	.67	.58
12. Driver	.63	.61	.99	.70	1.25	.68	.66	.55
13. Printer	.47	.53	.86	.44	1.05	.50	.66	.43
14. Laborer	.59	.49	.92	.65	1.25	.65	.58	.57
15. Farmer	1.20	1.12	1.50	1.34	1.64	1.13	1.05	1.01

	9	10	11	12	13	14	15
1. Businessman	.66	.61	.78	.63	.47	.59	1.20
2. Clerical worker	.66	.58	.70	.61	.53	.49	1.12
3. Draftsman	.91	.89	1.08	.99	.86	.92	1.50
4. Salesman	.67	.74	.72	.70	.44	.65	1.34
5. Electronic technician	1.16	1.13	1.33	1.25	1.05	1.25	1.64
6. Electrician	.61	.57	.67	.68	.50	.65	1.13
7. Machinist	.64	.63	.67	.66	.66	.58	1.05
8. Mechanic	.59	.51	.58	.55	.43	.57	1.01
9. Carpenter	.00	.47	.43	.45	.51	.43	.93
10. Metal worker	.47	.00	.48	.37	.40	.34	.92
11. Painter	.43	.48	.00	.43	.49	.44	.81
12. Driver	.45	.37	.43	.00	.40	.35	.88
13. Printer	.51	.40	.49	.40	.00	.44	1.03
14. Laborer	.43	.34	.44	.35	.44	.00	.88
15. Farmer	.93	.92	.81	.88	1.03	.88	.00

Table 7-4

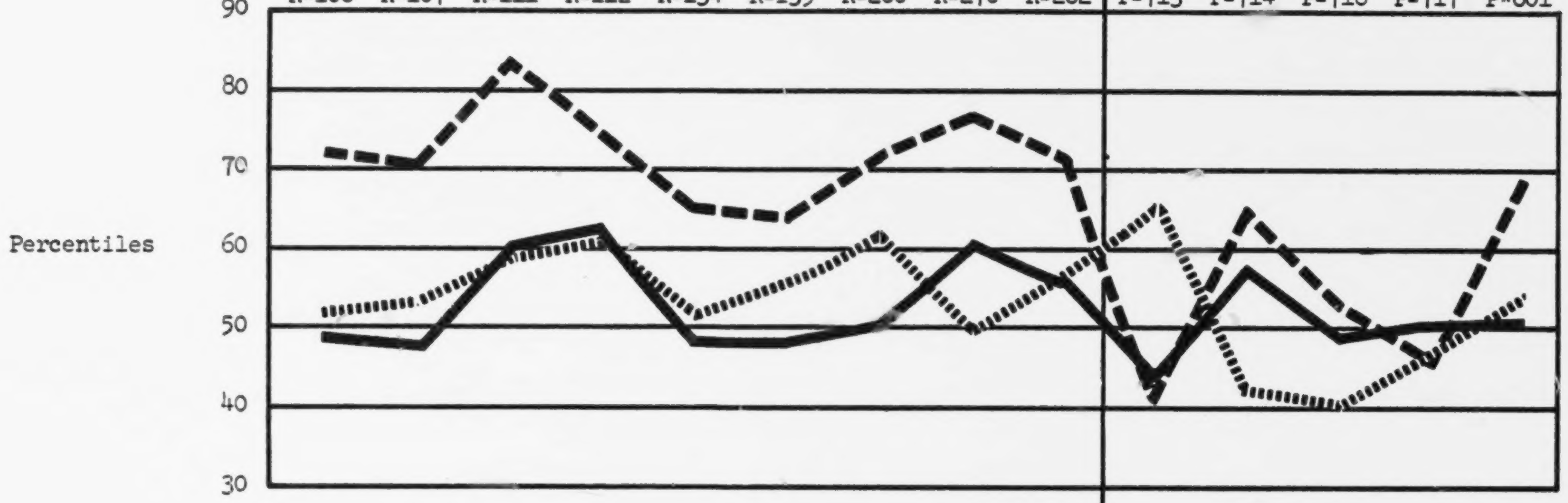
Mahalanobis Distance Matrix for Occupational Groups with Identical Job-Career Plans

	1	2	3	4	5	6	7	8
1. Businessman	.00	1.05	1.20	.96	1.53	1.15	1.27	1.26
2. Clerical worker	1.05	.00	1.76	1.25	1.81	1.07	1.39	1.28
3. Draftsman	1.20	1.76	.00	2.05	1.46	1.18	1.68	1.27
4. Salesman	.96	1.25	2.05	.00	1.78	1.09	1.31	1.39
5. Electronic technician	1.53	1.81	1.46	1.78	.00	1.19	1.20	1.29
6. Electrician	1.15	1.07	1.18	1.09	1.19	.00	.69	.63
7. Machinist	1.27	1.39	1.68	1.31	1.20	.69	.00	.62
8. Mechanic	1.26	1.28	1.27	1.39	1.29	.63	.62	.00
9. Carpenter	1.13	1.32	2.45	.92	2.01	1.06	1.03	1.21
10. Metal worker	1.18	1.28	1.59	1.43	1.77	1.16	1.21	.91
11. Painter	1.76	1.28	1.92	1.38	1.66	1.12	1.08	.95
12. Driver	1.58	1.31	2.60	1.47	2.33	1.40	1.41	1.44
13. Printer	.86	1.03	1.41	.85	1.30	.67	.84	.78
14. Laborer	1.03	.97	1.41	.91	1.87	1.09	1.10	1.10
15. Farmer	1.42	1.58	1.34	1.47	1.69	1.30	1.34	1.19

	9	10	11	12	13	14	15
1. Businessman	1.13	1.18	1.76	1.58	.86	1.03	1.42
2. Clerical worker	1.32	1.28	1.28	1.31	1.03	.97	1.58
3. Draftsman	2.45	1.59	1.92	2.60	1.41	1.41	1.34
4. Salesman	.92	1.43	1.38	1.47	.85	.91	1.47
5. Electronic technician	2.01	1.77	1.66	2.33	1.30	1.87	1.69
6. Electrician	1.06	1.16	1.12	1.40	.67	1.09	1.30
7. Machinist	1.03	1.21	1.08	1.41	.84	1.10	1.34
8. Mechanic	1.21	.91	.95	1.44	.78	1.10	1.19
9. Carpenter	.00	1.48	1.32	1.16	.97	.68	1.47
10. Metal worker	1.48	.00	1.33	1.51	.88	.84	1.03
11. Painter	1.32	1.33	.00	1.45	1.16	1.14	1.24
12. Driver	1.16	1.51	1.45	.00	1.42	.72	1.44
13. Printer	.97	.88	1.16	1.42	.00	.84	1.25
14. Laborer	.68	.84	1.14	.72	.84	.00	1.02
15. Farmer	1.47	1.03	1.24	1.44	1.25	1.02	.00

Figure 7-1

Mean Score Occupational Group Profiles



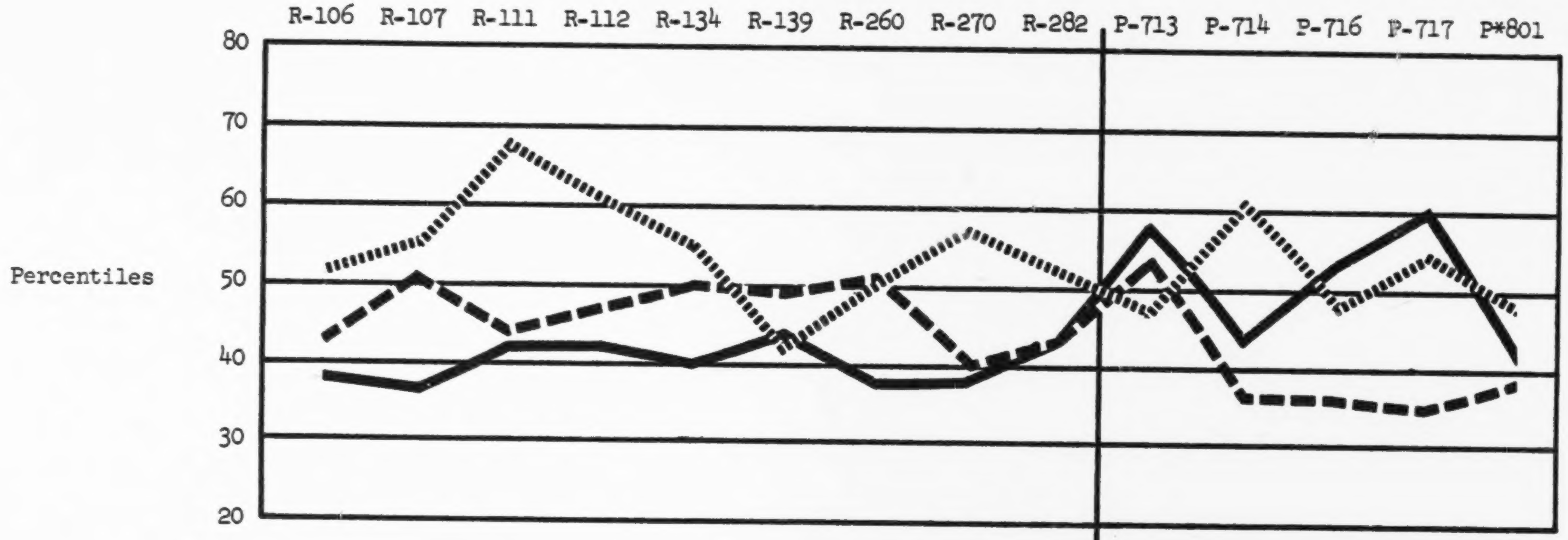
	R-106	R-107	R-111	R-112	R-134	R-139	R-260	R-270	R-282	P-713	P-714	P-716	P-717	P*801
▪▪▪▪▪ Businessman	52	53	59	61	52	56	62	50	57	65	42	40	46	54
▬ ▬ Electronic tech.	72	70	83	75	65	64	72	77	71	41	65	52	46	69
▬ Mechanic	49	48	60	62	48	48	50	60	56	43	57	49	50	50

Percentiles Based on Project TALENT Norms

Percentiles Based on Norms of 15 Occupational Groups

Figure 7-2

Mean Score Occupational Group Profiles



	R-106	R-107	R-111	R-112	R-134	R-139	R-260	R-270	R-282	P-713	P-714	P-716	P-717	P*801
▬ ▬ Clerical worker	43	51	44	47	50	49	51	40	43	53	36	36	35	38
▨ Machinist	52	55	68	61	55	42	50	57	52	47	61	48	54	48
▬ Laborer	38	37	42	42	40	44	38	38	43	58	43	53	60	42

Percentiles Based on Project TALENT Norms

Percentiles Based on Norms of 15 Occupational Groups different. This same occurence can be seen in Figure 7-2 where clerical workers and laborers scored similarly on several variables but had distinct profiles nevertheless.

Additional profiles need not be presented to point up the utility of the preceding methods for studying group differences. However, for those interested in studying individual groups, the means for all 15 occupations for each of the 14 test variables considered appear in Table 7-5. In general, the ranking of the occupational groups on each variable gave credence to the measures used. Because of the general overall ability of the electronic technicians, this is not always apparent unless the group scoring second highest and the occupations scoring lowest are also considered. The electronic technicians had the highest scores on eight of the nine ability related scales. Visualization in Three Dimensions was the single exception, and on that scale the electronic technicians had the second highest group mean. The draftsmen were also relatively high on the ability measures, scoring highest on Visualization in Three Dimensions and second highest on Math Information, Creativity, and Mechanical Reasoning. The salesmen and businessmen were highest on Office Interest; the farmers, highest on the Farming Interest scale; drivers and painters, highest on the Labor Interest Scale; mechanics, high on Mechanical Information; and businessmen, high on the Business and Accounting Information scale. These results provide further validation of both the test measures and the occupational groups.

The plot of the stable group centroids for the two best discriminant functions appear in Figure 7-3. This plot permits visualization of the occupational groups in discriminant space. The variables with the highest discriminant coefficients are listed in the figure on the appropriate axis. The per cents of the variance accounted for by discriminant functions I and II were 33.0 and 21.4, respectively. The plots of group centroids illustrate the distance matrix in that the mechanic, machinist, and electrician groups were the most similar groups, while the greatest differences were between the draftsmen and drivers and between the draftsmen and carpenters.

Table 7-5

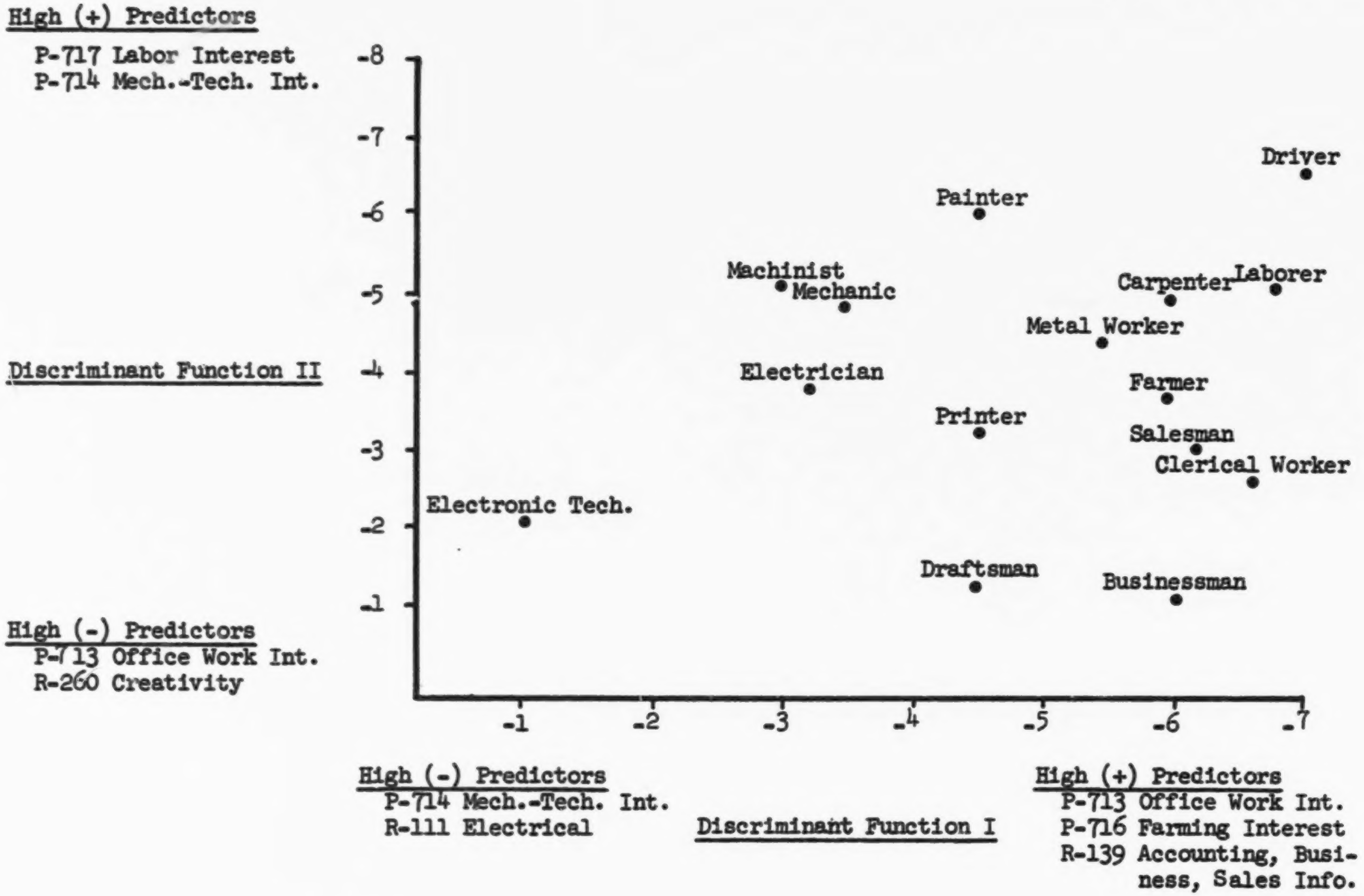
The Roster of Group Means and Standard Deviations - Full-Time Occupational Groups with Identical Career Plans

		Business-man	General Clerical Worker	Drafts-man	Sales-man	Elect. Tech.	Elect.	Machinist	Mechanic
R-106	Math Info	6.71	5.80	7.09	6.38	8.85	7.06	6.61	5.94
R-107	Phys. Sci. Info	8.88	8.57	9.05	8.10	10.96	8.77	9.06	8.30
R-111	Electrical Info	8.52	7.03	7.59	7.24	11.96	8.49	9.51	8.68
R-112	Mech. Info	10.86	10.43	11.41	10.05	13.11	11.54	11.84	11.87
R-134	Engineering Info	2.92	2.80	2.86	2.67	3.41	2.85	2.96	2.75
R-139	Business Info	4.00	3.63	3.82	3.24	4.37	3.59	3.29	3.61
R-260	Creativity	8.68	7.51	9.32	6.29	9.78	7.67	7.35	7.36
R-270	Mech. Reasoning	11.42	10.26	13.59	9.81	14.41	12.22	12.01	12.39
R-282	Vis. 3 Dimensions	8.58	7.40	10.14	7.19	10.11	8.58	8.22	8.51
P-713	Office Interest	14.85	12.49	11.73	14.86	10.00	10.73	11.20	10.48
P-714	Mech-Tech Interest	18.97	18.86	20.00	20.38	24.59	22.63	23.67	22.85
P-716	Farming Interest	19.70	18.89	22.95	21.05	22.96	19.53	21.87	22.19
P-717	Labor Interest	12.32	10.66	10.86	13.24	12.33	12.22	13.91	13.08
P*801	SEE	95.44	92.09	96.09	97.86	99.11	95.85	94.22	94.67

		Carpenter	Metal Trade	Painter	Driver	Printer	Laborer	Farmer	Std. Dev.	F ratio (ndf = 14 and 773)
R-106	Math Info	6.58	4.88	5.56	5.50	6.43	5.33	5.93	3.08	3.56
R-107	Phys. Sci. Info	7.97	8.13	8.00	6.57	8.17	7.07	8.46	3.41	3.24
R-111	Electrical Info	7.29	7.71	7.00	6.25	8.44	6.83	8.00	3.62	5.83
R-112	Mech. Info	10.77	11.04	10.64	9.79	10.98	10.00	10.46	3.42	3.09
R-134	Engineering Info	2.71	2.71	2.76	2.32	2.91	2.44	2.70	1.23	1.55
R-139	Business Info	3.32	3.63	3.28	3.54	3.48	3.37	3.66	1.61	1.34
R-260	Creativity	6.13	7.17	7.08	6.14	8.02	6.12	7.33	3.53	3.81
R-270	Mech. Reasoning	10.23	11.71	10.84	10.68	11.67	9.99	11.89	3.78	4.75
R-282	Vis. 3 Dimensions	7.16	8.29	7.84	7.07	8.13	7.37	7.93	2.98	3.31
P-713	Office Interest	12.45	9.88	10.92	12.39	11.98	13.35	11.89	7.96	1.86
P-714	Mech-Tech Interest	20.10	19.21	25.36	20.96	21.02	20.21	20.69	7.82	3.04
P-716	Farming Interest	23.19	23.50	26.96	24.54	20.39	23.25	29.07	10.17	3.87
P-717	Labor Interest	14.03	12.42	15.48	16.43	13.20	14.76	12.34	6.41	2.21
P*801	SEE	93.81	95.46	94.56	89.11	97.06	92.88	94.79	8.69	2.59

Figure 7-3

Centroids of Occupational Groups in Discriminant Space



With the great emphasis placed on higher education and the academically talented as this country's hope for continued greatness, there is a tendency to neglect and to overlook the potential resources of talent among the young people who have no plans for an extended education. Their needs for guidance in making career choices are very real, and as such, the "nonacademically talented" treated as a group require continued study.

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Chapter 8

Stability of Career Plans

John C. Flanagan

One of the original goals of Project TALENT was to achieve a better understanding of the career plans made by young people. Through the 1960 testing and the four one-year follow-up studies, much progress has already been made toward this goal. One aspect of career plans--their stability from high school to one year after high school--will be discussed in this chapter using comparisons of the plans indicated by 15, 16, 17, and 18 year-old high-school students and the plans indicated by these same young people on the one-year follow-up questionnaires. At the time of the follow-up studies, these young people were about 19 years of age.

Table 8-1 shows the career plans indicated by high-school students tested in 1960. The results shown are based on only those persons for whom follow-up data were later available. As stated in Chapter 2, the percentages from each grade replying to the mailed questionnaire varied between 37 per cent and 69 per cent. To correct for the bias introduced by basing the study on only these respondents, 5 per cent of the nonrespondents from each class were interviewed. Since data from these two groups were properly combined and weighted, the results from each of four classes reported in Table 8-1 represent unbiased estimates of the entire grade. Although the large relative weight given to individuals in the 5 per cent nonrespondent sample introduced a larger sampling error into these results, it is clear from comparing the four grades that the percentages and trends were not seriously distorted by this weighting procedure.

To provide a further check on the stability of these data and their representativeness of the class as a whole, the results given for the twelfth grade in Table 8-1 (weighted percentages based on respondents and 5 per cent of the nonrespondents) were compared with those reported in Table 8-2 (Flanagan, et al., 1964) based on the entire twelfth-grade class. For both males and females, well over half of the percentages in Table 8-1 were either the same or within one-tenth of one percentage point of the

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Table 8-1

Career Plans Indicated by Students at Various Grade Levels in 1960[a]

(Weighted Percentages Based on Respondents and Nonrespondents)

	Males				Females			
	Grade				Grade			
	9	10	11	12	9	10	11	
1. Mathematician	1.9	1.5	2.0	1.1	1.0	1.0	.6	
2. Physical scientist	4.6	3.5	3.0	3.0	1.0	1.0	.6	
3. Biological scientist	2.7	3.2	2.1	1.4	1.6	1.3	1.2	
4. Engineer	21.3	18.6	18.7	17.3	.6	.6	.2	
5. Physician	3.4	2.9	3.0	2.5	1.4	1.1	1.1	
6. Dentist	2.9	2.2	2.0	1.8	.3	.3	.3	
7. Nurse	.2	.2	.2	.3	14.6	12.3	12.0	1
8. Pharmacist	1.2	2.0	1.6	1.6	1.0	.8	.4	
9. Psychologist, sociologist	.1	.4	.4	.8	.9	1.2	1.3	
10. Social worker	.8	.9	.5	.6	1.5	2.8	2.5	
11. Clergyman, etc.	1.7	1.9	1.5	1.5	.4	.4	.3	
12. Government	.1	.3	.3	.5	.1	.1	.2	
13. Lawyer	3.3	3.6	3.0	3.4	1.2	.7	.9	
14. Teacher	3.6	4.8	5.4	7.5	15.8	15.2	15.8	1
15. Accountant	2.9	2.8	3.5	4.8	1.2	1.8	2.3	
16. Businessman	3.5	3.6	5.1	7.8	.5	.5	.7	
17. Writer	.4	.4	.7	.8	.9	.8	.9	
18. Artist, entertainer	1.9	2.4	2.1	1.6	3.6	3.1	2.8	
19. Engineering, scientific aide	1.5	1.0	1.4	1.0	.1	0	0	
20. Aviation	3.5	3.4	2.4	1.9	.4	.5	.4	
21. Medical technician	1.3	.3	.5	.3	1.0	1.5	1.7	
22. Office worker	.7	.5	.5	.5	24.4	25.2	25.9	3
23. Salesman	.8	.8	.9	1.4	.3	.4	.6	
24. Armed Forces	5.8	8.1	8.2	6.0	.8	1.2	1.1	
25. Protective	1.4	2.1	1.8	1.5	.1	.1	.2	
26. Skilled worker	5.5	6.2	7.2	7.6	0	0	.1	
27. Structural worker	.7	1.2	1.2	1.4	.1	0	0	
28. Housewife	.2	.1	.2	.4	11.2	11.5	12.6	
29. Barber, beautician	.6	.6	.7	.9	4.0	4.3	4.1	
30. Farmer	5.4	5.0	4.0	4.3	.2	.4	.2	
31. Not elsewhere classified	16.1	15.5	15.9	14.5	9.8	9.9	9.0	1
	100%	100%	100%	100%	100%	100%	100%	1
Total N (weighted)	671,976	675,705	755,949	577,728	733,086	694,447	797,775	670

[a]See Table G-1 (Appendix G) for occupations included in each category.

Table 8-2[a]

Career Plans Indicated by Students in Twelfth Grade in 1960

(Weighted Percentages Based on All Twelfth Graders)

	Males	Females
1. Accountant	4.8	2.8
2. Biological scientist (biologist, botanist, physiologist, zoologist, etc.)	1.4	.6
3. College professor	.6	.3
4. Dentist	1.8	.2
5. Engineer (aeronautical, civil, chemical, mechanical, etc.)	17.7	.2
6. Elementary school teacher	.6	9.5
7. High school teacher	5.8	7.3
8. Lawyer	3.4	.4
9. Mathematician	1.3	.5
10. Pharmacist	1.3	.4
11. Clergyman (minister, priest, rabbi, etc.)	1.6	.3
12. Physical scientist (chemist, geologist, physicist, astronomer, etc.)	3.0	.6
13. Physician	2.5	.6
14. Political scientist or economist	.5	.2
15. Social worker	.8	2.2
16. Sociologist or psychologist	.7	1.4
17. Armed Forces officer	4.5	.4
18. Artist or entertainer	1.9	2.3
19. Businessman	7.4	.5
20. Craftsman	1.2	0
21. Engineering or scientific aide	1.0	0
22. Forester	2.2	.1
23. Medical or dental technician	.5	2.4
24. Nurse	.2	10.1
25. Pilot, airplane	1.8	.5
26. Policeman or fireman	1.6	.1
27. Secretary, office clerk, or typist	.5	30.3
28. Writer	.6	.7
29. Barber or beautician	.8	4.2
30. Enlisted man in the Armed Forces	2.3	.1
31. Farmer	4.1	.2
32. Housewife	.1	10.4
33. Salesman or saleswoman	1.1	.6
34. Skilled worker (electrician, machinist, plumber, printer, etc.)	6.9	.1
35. Structural worker (bricklayer, carpenter, painter, paperhanger, etc.)	1.5	0
36. Some other occupation different from any above	12.0	9.5
	100%	100%

[a] From Table 5-4 of The American High-School Student.

comparable values reported in Table 8-2. For the males, only five of the percentages reported in Table 8-1 were more than three-tenths of 1 per cent different from the comparable percentages in the 1964 report. For the females only two of the comparable percentages differed by more than three-tenths of one percentage point.

As Table 8-1 indicates, the largest percentages of boys in grades 9, 10, 11, and 12 were planning careers as engineers. Although there was a slight downward trend from the ninth grade to the twelfth grade, it is clear that even in grade 12 many more students planned careers in engineering than would ever be successful in entering an engineering school. The three occupations planned by the next largest percentages of males were businessman, skilled worker, and teacher. More students in the higher grades than in the lower levels chose each of these occupations. When in high school about three out of four boys planned careers which required college training and only about one in four planned careers not requiring college training. According to current statistics, however, only one in four high-school boys can be expected to graduate from college. Therefore, it appears that at least half of the boys in high school had unrealistic career plans.

For the high-school girls there were three popular career groups. The most popular of these was secretarial and office work. This career showed an upward trend from 24 per cent in the ninth grade to 30 per cent in the twelfth grade. About 16 per cent of the girls in each of the four grades planned careers as teachers. The number of girls planning careers in nursing, the third most popular choice, decreased from 15 per cent in the ninth grade to only about 10 per cent in the twelfth grade. Two other careers frequently chosen were housewife, indicated by about 10 per cent of the girls, and beautician or cosmetologist, planned by about 4 per cent of the girls in each class. Although the number of girls planning careers in the professions, the physical sciences, and the social sciences was unreasonably large, it appears that, in general, the girls in high school were somewhat more realistic in their career planning than were the boys.

In Table 8-3 are the career plans indicated by the same students shown in Table 8-1 one year after their class had completed high school.

Table 8-3

Career Plans Indicated by Students One Year after Their Class Completed High School for Groups Tested in Various Grades

(Weighted Percentages Based on Respondents and Nonrespondents)

		Males				**Females**			
		Grade				Grade			
		9	10	11	12	9	10	11	12
1.	Mathematician	.6	.6	.5	.5	.2	.3	.3	.2
2.	Physical scientist	1.8	1.4	1.9	1.9	.3	.1	.2	.3
3.	Biological scientist	1.6	1.2	1.4	1.3	.2	.3	.3	.2
4.	Engineer	7.9	6.5	8.3	8.9	0	1	0	.2
5.	Physician	2.4	2.4	2.2	2.6	.2	.3	.4	.3
6.	Dentist	.8	.9	1.1	1.0	.2	0	0	0
7.	Nurse	0	0	0	0	5.2	5.6	6.6	6.2
8.	Pharmacist	.5	.9	.5	.7	.1	.1	.1	.1
9.	Psychologist, sociol.	1.4	1.4	1.0	1.0	1.0	.8	.9	.6
0.	Social worker	.3	.2	.1	.1	1.2	1.3	.9	1.2
1.	Clergyman, etc.	1.0	1.5	1.7	1.8	.7	.5	.5	.8
2.	Government	.8	.8	.6	.7	.3	.3	.4	.4
3.	Lawyer	2.5	2.6	2.6	2.7	.3	.1	.1	.2
4.	Teacher, librarian	8.6	7.8	7.9	8.2	18.3	17.4	18.3	16.4
5.	Accountant	3.7	3.6	3.8	3.8	.6	.7	.7	.6
6.	Businessman	10.6	8.6	7.9	7.7	2.9	2.2	1.9	1.6
7.	Writer	.5	.6	.4	.7	.6	.6	.7	.6
8.	Artist, entertainer	1.9	2.6	2.9	2.0	2.2	1.8	2.3	2.3
9.	Engineering, scientific aide	4.3	5.3	4.5	4.5	.4	.2	.3	.2
0.	Aviation	.5	.6	.4	.7	0	0	0	.1
1.	Medical technician	.6	.8	.4	.6	2.8	2.0	2.3	2.2
2.	Office worker	2.1	1.8	2.7	3.2	19.5	21.2	23.2	23.3
3.	Salesman	1.6	2.9	2.6	2.2	.6	1.0	.9	1.0
4.	Armed Forces	2.9	3.2	3.9	2.8	.1	0	.1	.3
5.	Protective	1.2	1.6	1.8	1.2	0	.2	.1	0
6.	Skilled worker	8.6	9.9	8.9	8.2	.6	.4	.8	.5
7.	Structural worker	5.0	6.3	5.6	5.1	.6	.6	.6	.7
8.	Housewife	.1	0	.1	.3	25.8	28.6	23.4	26.6
9.	Barber, beautician	1.8	1.6	1.4	1.8	6.9	6.4	6.4	5.3
0.	Farmer	2.5	2.6	2.6	3.4	0	.1	.1	0
1.	NEC	21.9	19.8	20.3	20.4	8.2	6.8	7.2	7.6
		100%	100%	100%	100%	100%	100%	100%	100%
	Total N (weighted)	671,976	675,705	755,949	577,728	733,086	694,447	797,775	670,455

The percentages planning various careers were quite different from those in Table 8-1. Less than half of the high-school boys who expected to work in mathematics, the sciences, or engineering were still planning these careers one year after high school. Other career-plan areas showing marked reductions during this period included aviation, the Armed Forces, and farming. These categories accounted for nearly 15 per cent of the career plans when the boys were in high school but less than 7 per cent one year after high school. There was also a decrease in the percentages expecting to make their career in the professions. Some of the career plans chosen more often by young men after high school than during high school were structural worker, salesman, and office worker. Together these accounted for only 3 per cent of the careers planned during high school but for 10 per cent of the plans after high school. There was also a slight increase in the percentages planning to work as teachers, businessmen, and skilled workers.

The girls showed similar but less marked shifts. The first 12 careers listed in Table 8-3, not including nursing, all require a college education. These accounted for the career plans of 8 to 12 per cent of the high-school girls. One year after high school only about 4 per cent of the girls were planning to work in these fields. A similar change occurred in the percentage of girls expecting to be nurses. In high school 10 to 15 per cent of the girls were planning such careers. One year after high school, only about 6 per cent planned nursing careers. The percentages choosing office work as a career shows a definite decrease. This was probably a direct result of the substantial increase in those intending to be housewives. The percentages planning careers in cosmetology also increased.

Although Tables 8-1 and 8-3 are relevant to the stability of career plans, Table 8-4 contains the direct data on the stability of plans during this period. Looking at the values at the bottom of Table 8-4, it is clear that there was very little stability to the ninth-, tenth-, eleventh-, and twelfth-grade plans of either boys or girls. The values varied between 17 per cent of the ninth-grade boys with the same career plans four years later to 41 per cent of the twelfth-grade girls with

Table 8-4

Percentages of Students Having Same Career Plans One Year after Their Class Completed High School as When Tested in 1960 in Grades 9, 10, 11, and 12

(Weighted Percentages Based on Respondents and Nonrespondents)

	Males				Females			
	Grade				Grade			
	9	10	11	12	9	10	11	12
Mathematician	3	4	11	17	2	3	15	18
Physical scientist	10	14	25	28	4	3	9	22
Biological scientist	3	9	12	14	2	4	4	12
Engineer	18	18	26	35	2	1	8	21
Physician	24	40	35	59	6	5	18	28
Dentist	14	9	22	33	0	1	0	2
Nurse	3	2	3	5	19	22	40	45
Pharmacist	8	15	13	35	2	3	10	17
Psychologist, sociologist	10	9	13	14	7	7	18	16
Social worker	0	0	3	6	6	6	8	16
Clergyman, etc.	22	26	49	66	44	9	18	33
Government	3	6	3	11	3	5	7	37
Lawyer	17	24	34	36	3	5	6	26
Teacher	24	28	40	49	48	49	57	63
Accountant	13	16	34	29	3	2	3	10
Businessman	32	21	26	26	2	5	11	8
Writer	6	9	10	46	4	16	19	18
Artist, entertainer	14	36	45	39	16	16	29	42
Engineering, scientific aide	4	10	3	9	0	0	0	9
Aviation	3	3	4	8	0	1	0	1
Medical technician	1	4	4	22	10	15	16	35
Office worker	4	4	18	10	32	38	47	45
Salesman	5	12	10	22	1	3	11	14
Armed Forces	3	6	13	12	1	1	2	18
Protective	8	12	14	24	2	3	4	15
Skilled worker	20	24	29	33	0	19	0	3
Structural worker	8	32	15	29	0	0	0	0
Housewife	3	3	1	18	44	50	44	59
Barber, beautician	6	12	22	21	24	21	34	42
Farmer	20	22	34	44	0	2	1	7
NEC	29	26	27	29	7	8	12	12
Overall Stability	16.8%	18.9%	25.0%	31.4%	26.1%	28.7%	36.4%	41.2%

the same plans one year later. For the boys, careers as clergymen and physicians showed a high degree of stability. Of those twelfth-grade boys planning careers in these fields, for example, over 50 per cent had the same plans after high school. The twelfth-grade boys expecting to be teachers, writers, and farmers also showed better than average stability in their plans. Forty-four to 49 per cent of these young men reported the same plans one year later. Similar patterns are shown for the boys from the ninth, tenth, and eleventh grades. The overall stability of plans, however, decreased from 41 per cent (grade 12) to 26 per cent (grade 9). For ninth-grade boys, only one career, businessman, was still planned by more than 30 per cent of the boys who chose it in high school. Only 18 per cent of the very large number of boys in the ninth grade planning careers as engineers still intended to work in this field four years later.

It should be noted that some of these stability coefficients were based on relatively small numbers of students. This accounts for some of the fluctuation from class to class, especially in the small percentages. However, the overall picture revealed by these coefficients can be regarded as accurate.

For the girls, teacher and housewife were the only career plans showing more than 50 per cent stability from any grade level to one year after high school. Careers with more than 40 per cent stability included office worker, nurse, beautician, and artist and entertainer. Table 8-4 also indicates that 44 per cent of the ninth-grade girls planning careers in the clergy had the same plans four years later. This percentage, however, is misleading. The figure based on the mailed questionnaire respondents alone was only 12 per cent. Because of the small number of girls planning careers in the clergy, a single stable case in the correction sample with its large weight resulted in this overall figure of 44 per cent.

The high degree of instability of the plans of these boys and girls in ninth-, tenth-, eleventh-, and twelfth-grade raises the question as to whether the new career plans were closely related or generally unrelated to the initial career plan. The tables in Appendix G show the percentages of young men and women initially selecting a particular career who subsequently chose another career or held the same career plan. Inspection of some of the plans of individuals initially in large groups such as those intending to be engineers indicates quite clearly that there was no pattern to the new plans which could be predicted from the initial plan with better than chance success. This emphasizes the necessity of turning to more stable characteristics of the individual, such as those measured by the 1960 battery of tests, to predict his ultimate career plans rather than depending on his initial selection to provide important clues. Chapter 9 will illustrate how 1960 data can be used for these predictions.

Although it is unnecessary that the student plan his specific career during high school, he must at least choose some broad field if he is to lose no time in preparing for his ultimate career. As the data in this chapter have shown, however, the plans made in high school are unrealistic and unstable. The schools, therefore, must develop a better program for helping the student to understand both himself and the various roles for which he might prepare himself. Project TALENT is now carrying out research which will aid in the development of such a program, for example, a computer-measurement system of guidance as described in Chapter 11.

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Chapter 9

Predicting Career Plan Changes

William W. Cooley

In Chapter 8 we saw the great number of career plan changes that took place during and immediately following high school. This great instability in plans suggests that plans formed in high school are unrealistic for one reason or another. This is an unfortunate phenomenon, insofar as educational decisions made during and immediately following high school are based upon these unrealistic (or at least unstable) plans.

There is really no concern if a boy changes his plans from physics to mathematics between grade 10 and grade 12 when there are no necessary differences in the high-school behavior of future physicists and future mathematicians. On the other hand, if a tenth-grade boy planning to go into business later decides at grade 12 to become an astronautical engineer, he will be rather set back if he has not taken the necessary mathematics options during high school.

These practical guidance considerations are based on the following principles: (1) there is no single high-school curriculum appropriate for all students, (2) the appropriateness of a curriculum depends in part upon career plans of the student, (3) different career plans are appropriate for different students, and (4) the appropriateness of a career plan depends upon the abilities and motives of the student and the projected supply and demand characteristics of the job market.

Turning from practical to theoretical considerations, the study of change in plans becomes even more important. One of the goals of Project TALENT is to better understand the process of career development. A large and important aspect of this career process is the manner in which students "sort themselves" over time. Insofar as this sorting is done rationally, it involves the individual's consideration of his abilities and motives and his perception of the occupational goals he has established for himself. The individual will change his plans and goals when he perceives a discrepancy between what he thinks of himself and what he thinks of his plans and goals. If we can identify those personal characteristics which are related to changes in plans and can actually anticipate such changes, we are then identifying the attributes which are functionally related to those changes. Planning in terms of test data is reasonable only if such data actually allow one to anticipate changes which will take place in plans _and_ if the variables used in predicting those changes can be fitted into a convincing theoretical model of the career choice process.

Definition of Criterion Groups

The success of prediction depends upon: (1) the nature of the predictors, (2) the definition of the criterion to be predicted, and (3) the mathematical-statistical model used in prediction. In Chapter 4 we considered the predictors available in the TALENT battery and the use of multiple discriminant analysis and probability classification in making predictions to group membership criteria. We now must define the criterion to be predicted.

In Chapter 8 we considered the extent to which career plans changed between high school and one year after high school. Obviously, the extent to which plans are considered stable depends upon how one classifies plans in the first place. For example, plans will appear to be more stable if broader categories are used. In previous research Cooley (1963 and 1965) used a four-category classification scheme for dealing with career plan changes during and immediately following high school. The four categories were defined in terms of whether or not the student was planning college _and_ whether or not the student was planning a career in the science-technology area.

Applying this four-cell scheme to the grade 11 follow-up sample (Flanagan, et al., 1965), we found plans to be 60 per cent stable over a two-year period. Subsequent experience with these four groups has indicated that the two college-bound groups should be split into four, the college-going science-technology group into a physical-mathematical-engineering area and a biological-medical area, and the other college group into business and non-business career areas. Figure 9-1

Figure 9-1

Six-Category Classification Scheme

	Science-Technology		Nontechnology	
	(1) Physical	(2) Biological-Medical	(3) Nonbusiness	(4) Business
College	Mathematician Physical scientist Engineer Scientific aide	Biological scientist Nurse Physician Pharmacist Dentist Medical technician	Social scientist Social worker Clergyman Teacher	Accountant Lawyer Businessman Government Salesman
Noncollege	(5) Aviation Engineering aide Medical technician Skilled worker Structural worker		(6) Government Salesman Accountant Service worker Businessman Office worker	

Table 9-1

Career Group Self-Predictions
(Grade 9 Males)

	Follow-up Plans						
Grade 9 Plans	1	2	3	4	5	6	Grade 9 Totals
1. Physical science	965	291	378	545	121	79	2,379
2. Biological-Medical	106	377	173	213	29	37	935
3. Humanities	49	47	261	120	36	19	532
4. Business (C)	57	50	140	440	24	39	750
5. Technical	94	28	67	97	316	128	730
6. Business (NC)	36	27	72	178	93	125	531
Follow-up totals	1,307	820	1,091	1,593	619	427	5,857

42 per cent hits (underlined cells define "hits")

illustrates this classification scheme. The occupations listed in each cell define the composition of the six groups in terms of the 31 categories used in Chapter 8. Some occupations, such as farmer, have not yet been fitted into this scheme.

The six categories were determined by considering (1) the empirical similarity of more specific career groups (i.e., boys planning either physics or chemistry were grouped into physical science because their 1960 TALENT profiles were similar), (2) the types of educational decisions students have to make as they move toward these various careers (since there is no point in making finer distinctions in career planning earlier than required by the educational system), and (3) the types of back-and-forth changes which tend to be made in career planning.

The classification of a student depends upon his plans with respect to college and with respect to the broad career areas. Groups 5 and 6 were smaller than expected either because college plans were unknown or inconsistent with career plans, or because some of the non-college work areas had not yet been fitted into this six-cell scheme.

Table 9-1 is the joint frequency distribution of career plans at grade 9 and one year after high school. For example, of the 2,379 grade 9 males planning careers in the physical science area, only 965 of them had these same plans four years later. An additional 342 boys changed to the physical sciences from one of the five other areas, bringing the total to 1,307 boys planning careers in the physical sciences one year out of high school. Again we see here the same sort of migratory trends which were reported in Chapter 8. The Chapter 8 figures, however, better describe the frequency of changes in the population, because they are based upon exhaustive categories and utilize TALENT's probability sample weighting system. In the analyses which follow, we will be comparing the extent to which we can predict grade 9 plans with the extent to which we can predict follow-up plans, using scales from the TALENT 1960 test battery as predictors.

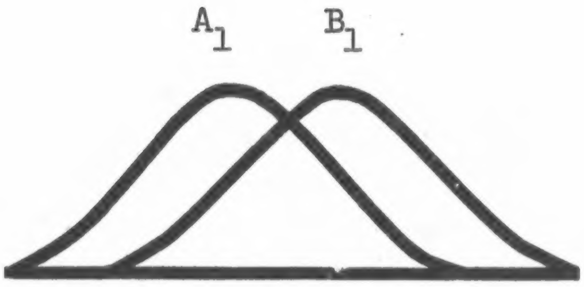
Predictive versus Concurrent Validity

One empirical approach to the problem of studying career plan changes is to examine the extent to which measures of ability and motives are related to current plans as compared to later plans. The univariate F ratio provides a useful basis for comparing predictive and concurrent validities, since career plans generally form a nominal scale and the usual validity coefficients are not appropriate. If the F ratios for predictor measures are larger when career group membership is based upon future plans than when group membership is based upon current plans, then the predictive validity for that test is greater than the concurrent validity.

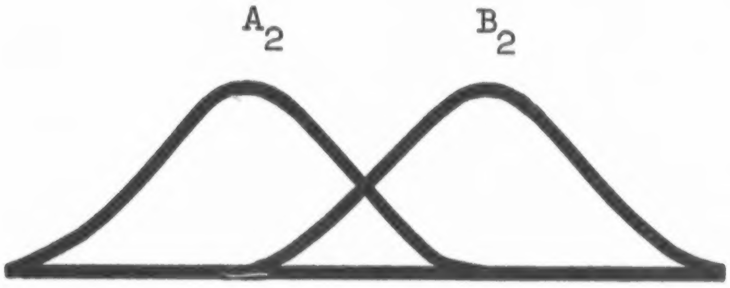
The F ratio compares the variation among groups with the variation within groups. As people move from group to group over time, the F ratios of among-group differences to within-group differences will increase if people enter groups that they more nearly resemble. Figure 9-2 illustrates this difference for groups A and B on variable X. A_1 and B_1 represent group composition at the time when X was measured and

Figure 9-2

Small F Ratio



Large F Ratio



A_2 and B_2 represent group composition at some later time. In the TALENT example in this chapter, X represents a variable from the 1960 test battery and group membership is based upon career plans in 1960 for concurrent validity and plans on the follow-up questionnaire for predictive validity. The same students were used in both analyses.

Table 9-2 lists the two columns of F ratios for 50 TALENT predictors, using a 50 per cent random sample of the students summarized in Table 9-1. If a predictor's F ratio using grade 9 plans were greater than its F ratio using follow-up plans, then the criterion groups tended to be better separated at grade 9 than at one year out of high school. Comparing the two columns of F ratios, we see that some increased and some decreased. Further inspection shows that, in general, the F ratios increased for the ability measures (variables 1 - 23) and decreased for the motive measures (variables 24 - 50). That is, ability measures were more highly related to what would happen than to what was currently planned, whereas motive measures appeared to be more related to current plans than to future plans. Because this finding can have great implications for guidance, much more clarification is required than is found in Table 9-2.

Closer examination of a few variables proves to be revealing. Table 9-3 shows how the means of the six groups on Physical Science Interest (P-701) changed from grade 9 to the time of the follow-up study. Since both analyses involved the same students, the grand mean remained unchanged. One interesting trend revealed in this table is that the physical science group mean also remained unchanged, despite the fact that only 40 per cent of the boys in that group as ninth graders were still there in the follow-up study. The implication is that stability of a physical science career plan is independent of the initial score on the Physical Science Interest scale. That is, with the mean not shifting and over one-half of the original group leaving and only a few entering, those who left must have come from above the group mean as well as from below the mean. The other five group means moved up on P-701 approximately in proportion to the number coming into each group from the physical science group. Note that the within-group standard deviation

Table 9-2

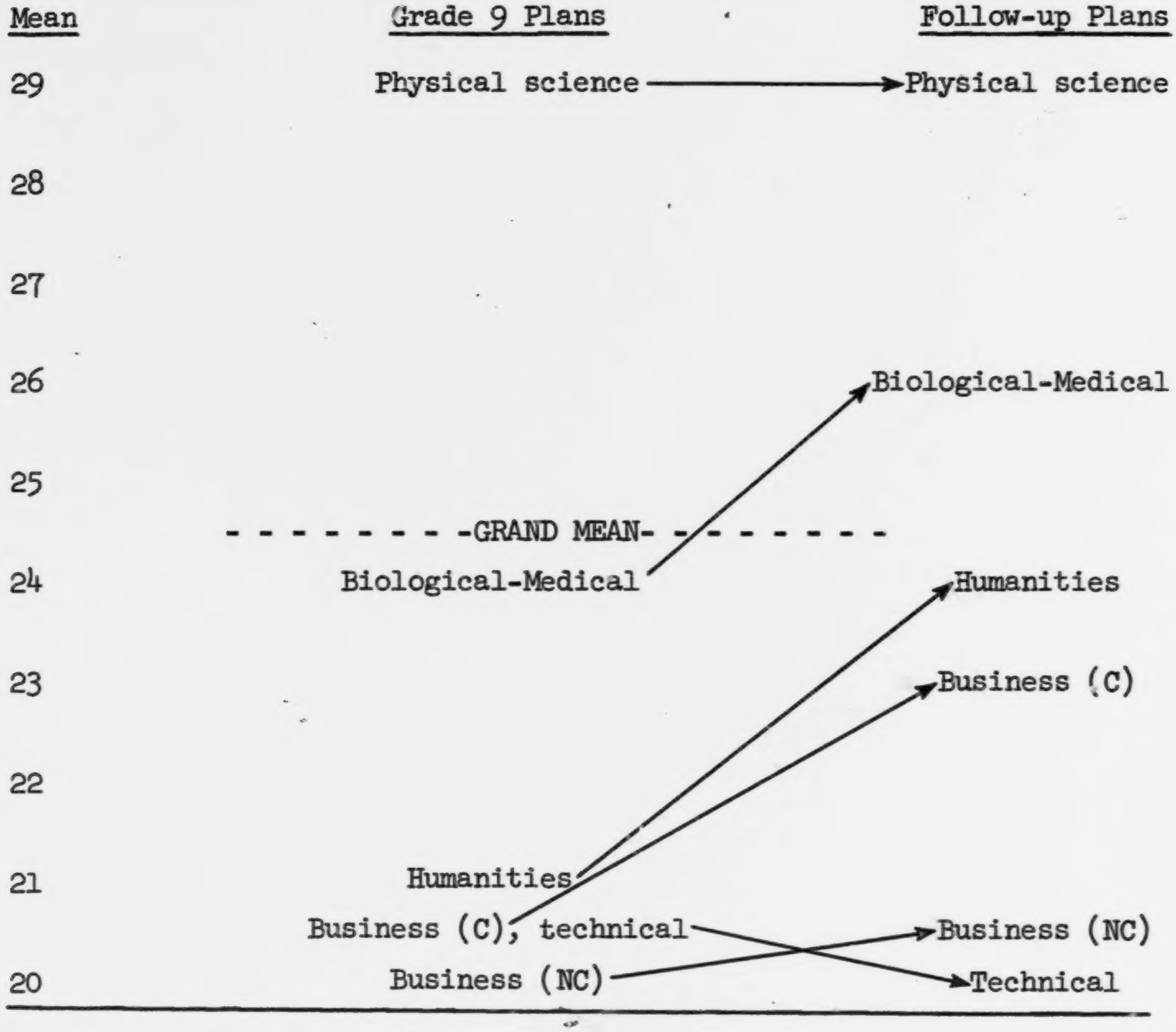
Predictive vs. Concurrent Validity

		F Ratios (ndf = 5 and 2,925)	
	Predictor	Grade 9 Plans	Follow-up Plans
1. R-102	Vocabulary	84	119*
2. R-103	Literature	68	107*
3. R-104	Music	61	86*
4. R-105	Social Studies	103	149*
5. R-106	Mathematics	89	134*
6. R-107	Physical Science	79	111*
7. R-108	Biological Science	48	78*
8. R-112	Mechanics	41*	35
9. R-113	Farming	25	31*
10. R-115	Sports	60	84*
11. R-212	Memory for Words	23	40*
12. R-230	English Total	88	156*
13. R-250	Reading Comprehension	108	148*
14. R-260	Creativity	48	56*
15. R-270	Mechanical Reasoning	45	66*
16. R-281	Visualization in Two Dimensions	14	20*
17. R-282	Visualization in Three Dimensions	38	52*
18. R-290	Abstract Reasoning	37	73*
19. R-340	Mathematics Total	94	153*
20. R-410	Arithmetic Computation	59	69*
21. R-420	Table Reading	10*	6
22. R-430	Clerical Checking	11*	5
23. R-440	Object Inspection	6	6
24. R-601	Sociability	25*	14
25. R-602	Social Sensitivity	26*	15
26. R-603	Impulsiveness	5*	2
27. R-604	Vigor	17*	10
28. R-605	Calmness	29*	15
29. R-606	Tidiness	26*	12
30. R-607	Culture	29*	14
31. R-608	Leadership	20*	13
32. R-609	Self-Confidence	19*	17
33. R-610	Mature Personality	48*	32
34. P-701	Physical Science	171*	83
35. P-702	Biological-Medical	124*	66
36. P-703	Public Service	31*	25
37. P-704	Literary-Linguistic	31*	25
38. P-705	Social Service	64*	30
39. P-706	Artistic	7*	5
40. P-707	Musical	5	8*
41. P-708	Sports	4	7*
42. P-709	Outdoor Recreation	11*	4
43. P-710	Business-Management	19*	11
44. P-711	Sales	32*	15
45. P-712	Computation	32*	11
46. P-713	Office Work	18*	4
47. P-714	Mecnanical-Technical	75*	45
48. P-715	Skilled Trades	46*	41
49. P-716	Farming	15*	10
50. P-717	Labor	43*	34

* Indicates higher F ratio of the pair.

Table 9-3

P-701 Physical Science Interest Means



	Grade 9 Plans	Follow-up Plans
F	170.9	83.5
Within Std. Dev.	7.2	7.5

did not change to any great extent. Therefore, the F ratio based upon follow-up plans was smaller because the differences among weighted means diminished. A surprising finding here is that the mean for the technical worker group became the lowest of the six group means on Physical-Science Interest.

Now we have to ask the question: Why aren't scores on Physical Science Interest related to staying in that career group? A reason emerges when the items are examined in Table 9-4. The students were asked to rate each listed occupation or activity on a five-point scale from "I would like this very much" to "I would dislike this very much." A scale based upon these items reflects the student's current perception of work and workers which will certainly change as his career plans

Table 9-4

Physical Science Interest Items

Scale 701 - Physical Science, Engineering, and Math	Item Number
Occupations	
Chemist	4
Civil engineer	5
Astronomer	27
Research scientist	28
Chemical engineer	45
Aeronautical engineer	48
Electrical engineer	68
Mining engineer	69
Mechanical engineer	90
Mathematician	91
Activities	
Physics	126
Calculus	128
Chemistry	162
Play chess	163
Solve puzzles	164
Algebra	180

Number of items = 16

Table 9-5

R-601 Sociability Means

Mean	Grade 9 Plans	Follow-up Plans
7.3	Business (C)	
7.2	Biological-Medical	
7.1		
7.0		
6.9		Business (C)
6.8		Humanities
6.7		Biological-Medical
6.6		
6.5	Humanities	
6.4	- - - - - - - - -GRAND MEAN- - - - - - - - -	Business (NC)
6.3	Physical science	
6.2		
6.1	Business (NC)	
6.0		
5.9		Physical science
5.8		
5.7		Technical
5.6		
5.5		
5.4	Technical	
F	25.10	14.47
Within Std. Dev.	2.8	2.8

change. Guidance procedures which use a single interest score such as this as an indication of what occupation the student may choose are indeed circular. For a boy who is planning a career in science at the time he takes the interest test, a score on a Physical Science Interest scale is related to becoming a scientist _only_ insofar as his plans are stable. We will see later in this chapter, however, that his entire interest profile does contain information regarding his expected future plans.

Turning to scales from the motives area which are based on nonvocational items such as the Student Activities Inventory (SAI), we notice a decrease in F ratios. Sociability, for example, decreased from an F of 25 to 14 (Table 9-5). Although the dispersion within groups remained constant, the group means moved closer together. Some interesting shifts occurred, however. A boy high on Sociability was more likely to leave the physical science area than a boy low on Sociability. Also notice that the two noncollege groups moved up on this scale, indicating that those originally in the group who changed to one of the four college groups tended to be below the original group mean on Sociability.

The items in the Sociability scale of the SAI are listed in Table 9-6. Although these items are clearly free of vocational content, the scale was still a better predictor of current plans than future plans.

Table 9-6

R-601 Sociability Items

- 8. I like to spend a good deal of time by myself.
+ 13. I'd rather be with a group of friends than at home by myself.
- 31. People consider me the quiet type.
+ 33. People seem to think I make new friends more quickly than most do.
+ 38. I couldn't get along without having people around me most of the time.
+ 63. I enjoy getting to know people.
+ 78. I like to be with people most of the time.
+ 93. I go out of my way to be with friends.
- 108. I prefer reading a good book to going out with friends.
+ 112. People consider me good-natured.
+ 123. People consider me sociable.
+ 138. I am friendly.

However, the changes in group means which occurred do indicate that this type of variable may still be useful in understanding plan changes.

Turning to ability tests, the results clearly indicate their increasing predictive utility over time. The F ratio for Mathematics Total (R-340), for example, increased from 94 to 153 (Table 9-7). Boys below the group means tended to drop out of the two college science groups, while the means for the two noncollege groups became even lower. This decrease indicates that those young men with mathematical ability scores above the group mean who were not planning college in ninth grade later tended to migrate into the college-going groups. The mathematics means for the two college groups not involving science-technology remained the same.

These three examples using science interest, sociability, and mathematics ability, illustrate one way of examining the differences among the criterion groups and comparing differences at one time with group differences at a later time. There are 47 more variables to describe, and the 50 analyzed represent only about one-half of the available TALENT battery. We need to turn now to some type of multivariate procedure which can help to summarize all this information.

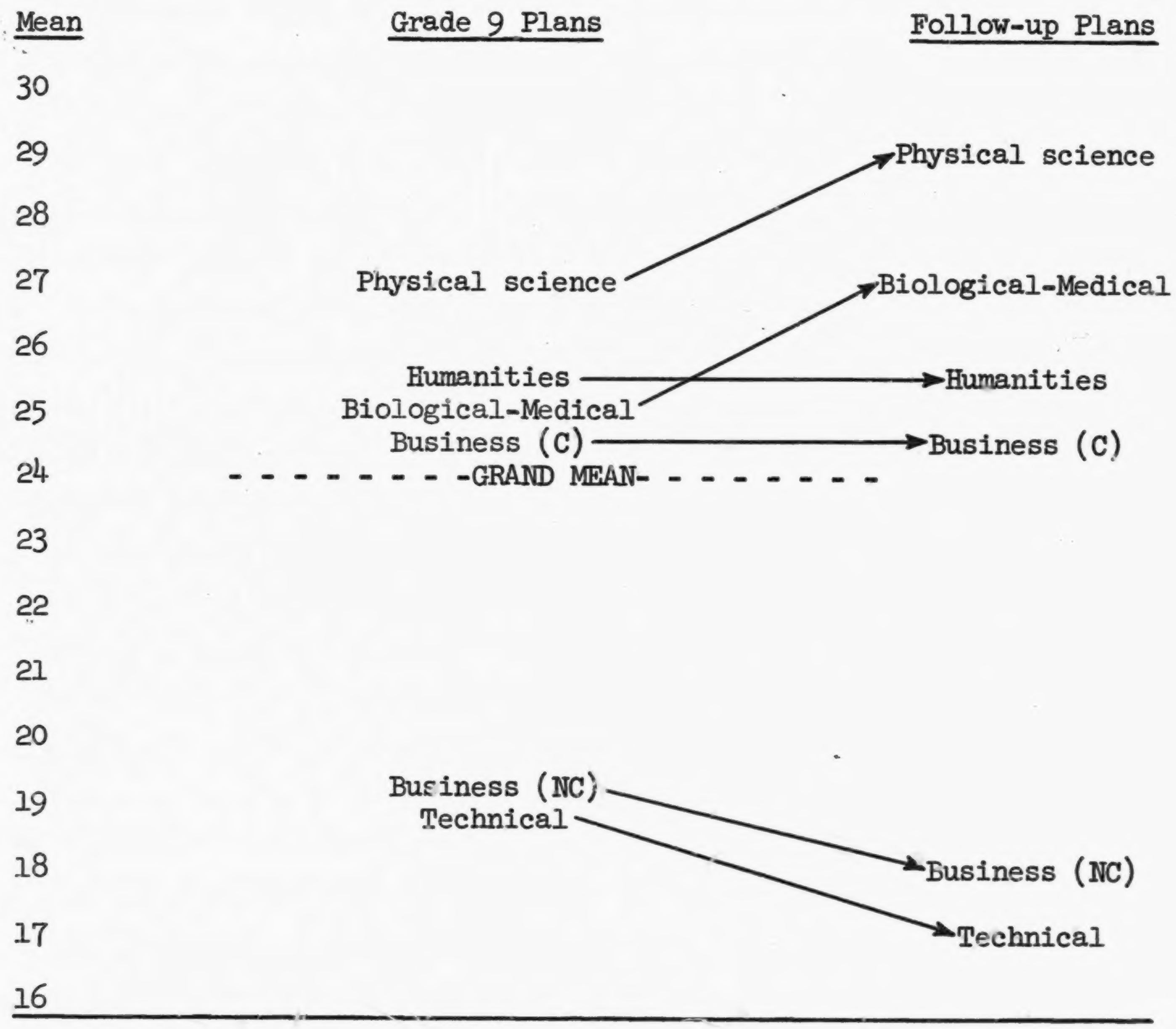
A Study of Changers

The large samples in Project TALENT allow the investigator to examine groups of young men who made specific types of career plan shifts. Referring back to Table 9-1, we see that in this subsample of grade 9 boys alone there were, for example, 121 subjects who shifted from plans for a professional career in the physical science area to plans for a career as a technical worker. This one group of changers alone is larger than samples used in some very prominent studies of career development. Therefore, Project TALENT has a rather unique opportunity in the study of career plan changes.

In Table 9-1 there are 5,857 boys distributed into one of 36 groups, the six groups in the diagonal cells indicating no change in plans and the 30 off-diagonal groups indicating specific types of changes. Membership in these 36 groups served as the criterion for three discriminant

Table 9-7

R-340 Math Total Means



	Grade 9 Plans	Follow-up Plans
F	94	153
Within Std. Dev.	7	7

analyses, using the three sets of TALENT variables summarized in Table 9-8 as predictors.

These three computer analyses produced more paper output than is contained in this entire report. However, an advantage of a multivariate technique like discriminant analysis is that it summarizes large amounts of information into small tables or graphs. From this particular series of analyses, the most interesting results are illustrated in Figures I-1, I-2, and I-3 of Appendix I. (These figures had to be put in the last appendix for report production reasons. The reader is encouraged to turn to them while reading this section.)

The two axes of Figure I-1 are two discriminant functions based on the 17 interest scales. These two functions, independent recombinations of the 17 scales which best separated the 36 groups, defined a two-dimensional space in which the means (called centroids here) of the 36 groups can be located as a point or vector. Each centroid is labeled using the notation of Table 9-8. Arrows are used to connect the centroids of the six stable groups with the centroid of the five groups who left that particular group. For example, on the left in Figure I-1 is the physical science group centroid. The upper arrow leading out from that centroid locates the centroid of those boys who switched from physical science to technical worker. Notice that this PS-TE group lies between the group it left and the group to which it migrated. Moving around the figure from BNC to MB, we see that this directional trend is true in all cases.

Turning to the centroids of the other five stable groups, we also see that the arrows radiating out from their centroids are properly oriented toward the appropriate group. This means that the interest profiles of the changing groups tended to "explain" the type of change which took place.

This tendency is even more dramatically indicated in Figure I-2, in which the ability information is summarized in the first two discriminant functions. The fact that the arrows are longer here indicates that the ability measures were more highly related to the type of plan change

Table 9-8

Variables for 36-Group Discriminant Analysis

Criterion Groups[a]

1. Physical Science (PS)
2. PS-MB
3. PS-HU
4. PS-BC
5. PS-TE
6. PS-BNC
7. MB-PS
8. Medicine-Biology (MB)
9. MB-HU
10. MB-BC
11. MB-TE
12. MB-BNC
13. HU-PS
14. HU-MB
15. Humanities (HU)
16. HU-BC
17. HU-TE
18. HU-BNC
19. BC-PS
20. BC-MB
21. BC-HU
22. Business-College (BC)
23. BC-TE
24. BC-BNC
25. TE-PS
26. TE-MB
27. TE-HU
28. TE-BC
29. Technical (TE)
30. TE-BNC
31. BNC-PS
32. BNC-MB
33. BNC-HU
34. BNC-BC
35. BNC-TE
36. Business-Noncollege (BNC)

		Predictor Variables
1.	R-102	Vocabulary
2.	R-103	Literature
3.	R-104	Music
4.	R-105	Social Studies
5.	R-106	Mathematics
6.	R-107	Physical Science
7.	R-108	Biological Science
8.	R-112	Mechanics
9.	R-113	Farming
10.	R-115	Sports
11.	R-212	Memory for Words
12.	R-230	English Total
13.	R-250	Reading Comprehension
14.	R-260	Creativity
15.	R-270	Mechanical Reasoning
16.	R-282	Visualization in Three Dimensions
17.	R-290	Abstract Reasoning
18.	R-340	Mathematics Total (Parts I, II, III)
19.	R-410	Arithmetic Computation
		Interest Variables
1.	P-701	Physical Science, Engineering, Math
2.	P-702	Biological Science and Medicine
3.	P-703	Public Service
4.	P-704	Literary-Linguistic
5.	P-705	Social Service
6.	P-706	Artistic
7.	P-707	Musical
8.	P-708	Sports
9.	P-709	Hunting and Fishing
10.	P-710	Business-Management
11.	P-711	Sales
12.	P-712	Computation
13.	P-713	Office Work
14.	P-714	Mechanical-Technical
15.	P-715	Skilled Trades
16.	P-716	Farming
17.	P-717	Labor
		SAI Variables
1.	R-601	Sociability
2.	R-602	Social Sensitivity
3.	R-603	Impulsiveness
4.	R-604	Vigor
5.	R-605	Calmness
6.	R-606	Tidiness
7.	R-607	Culture
8.	R-608	Leadership
9.	R-609	Self-Confidence
10.	R-610	Mature Personality

[a] For example, PS-MB indicates that group of boys who changed from physical science at grade 9 to medical-biology plans at follow-up.

which occurred than were the interest measures. In fact, most of the changer centroids are closer to the groups they moved into than to the groups they left. This latter trend is summarized in Table 9-9, which gives the two Mahalanolis D^2 distance measures of the shifting group, one with the group left and the other with the group entered. For example, group 2 changed from physical science plans to medical-biological plans. The fact that D^2 is smaller between group 2 and the medical-biological group (.41) than between group 2 and the physical science group (.62) indicates that the average profile of these particular changers more closely resembled the group into which they moved. This was true for 23 of the 30 D^2 comparisons. Incidentally, although the D^2 values were computed in the 19-dimensional ability space, the relative distances were rather close to those indicated in Figure I-2. This illustrates the fact that the two-dimensional discriminant space preserved most of the information about group differences found in the 19-dimensional test space.

Turning to the 10 temperament scales from the SAI, the first two discriminant functions in Figure I-3 show a similar, if less dramatic directional tendency. Even here the angle between the change vector and a line between the two relevant stable groups tends to be smaller than the angle between the change vector and lines drawn from the group left to the other four stable group centroids. That is, the change in plans was, in general, directionally consistent with temperament profiles. The results of these three figures are truly remarkable testimonies of the predictive validities of the TALENT battery.

It is important to remember that considerable changes in group membership will continue to occur over time. We expect that our five-year follow-up data, now being collected, will indicate the further shift of the centroids of changer groups from the centroids of the original plans to the centroids of the new plans. Also, after this additional sorting has taken place, we will probably be able to use narrower career classification categories for more refined predictions.

Table 9-9

Distances Measures between Changing Career-Plan Groups and Corresponding Stable Groups

Centroid	D^2 with Group Left	D^2 with Group Entered
2. PS(1) to MB(8)	.62	.41
3. PS(1) to HU(15)	.76	.66
4. PS(1) to BC(22)	.87	.61
5. PS(1) to TE(29)	1.73	.97
6. PS(1) to BNC(36)	1.61	1.17
7. MB(8) to PS(1)	.82	.65
9. MB(8) to HU(15)	.62	.64
10. MB(8) to BC(22)	.74	.39
11. MB(8) to TE(29)	2.51	1.48
12. MB(8) to BNC(36)	2.20	.77
13. HU(15) to PS(1)	1.06	.62
14. HU(15) to MB(8)	.71	.81
16. HU(15) to BC(22)	.55	.40
17. HU(15) to TE(29)	1.72	1.39
18. HU(17) to BNC(36)	1.48	1.56
19. BC(22) to PS(1)	.95	.95
20. BC(22) to MB(8)	.75	.59
21. BC(22) to HU(15)	.48	.62
23. BC(22) to TE(29)	2.39	1.43
24. BC(22) to BNC(36)	1.32	1.03
25. TE(29) to PS(1)	1.67	1.08
26. TE(29) to MB(8)	1.81	1.39
27. TE(29) to HU(15)	1.33	1.52
28. TE(29) to BC(22)	1.10	1.23
30. TE(29) to BNC(36)	.71	.65
31. BNC(36) to PS(1)	1.96	1.32
32. BNC(36) to MB(8)	1.79	1.33
33. BNC(36) to MU(15)	1.37	.99
34. BNC(36) to BC(22)	1.33	.81
35. BNC(36) to TE(29)	.80	1.02

Predicting Future Plans

Another multivariate approach to this study of career development is to examine the extent to which career plans following high school can be predicted from the grade 9 TALENT battery. This can be accomplished by using discriminant analysis and probability classification techniques. In the following two discriminant analyses, the six groups of Figure 9-1 based upon follow-up plans served as the criterion measure. Twenty-three ability measures were used in the first analysis and 27 motive measures in the second. These two sets of variables are listed in Table 9-2, the first 23 being the ability measures.

The two highly significant discriminant functions which were produced accounted for 93 per cent of the discriminating variance available in the 23 ability measures. The information needed to examine the nature of these two functions is summarized in Table 9-10. The first function was essentially a matter of general scholastic ability, since it was highly correlated with all of the tests from that general area. The relative positions of the six group centroids are also shown in Table 9-10. Here the large separation between the four college groups and two noncollege groups is clearly evident.

The second function, which was uncorrelated with the first, was primarily based upon information contained in the mechanical and mathematical areas. It is interesting to note that this function had signigicant negative correlations with Sports and Literature Information. The higher the student's score on this function, the greater the probability that he was planning a career in the science-technology area. Note that the medical-biological group was not particularly high on this function.

Turning to the 27 motive measures, we also find two major discriminant functions. In spite of the fact that they were based upon quite different types of information, these group separations were quite similar to those resulting from the ability information. In Table 9-11, the first function primarily separated the four college groups from the noncollege boys, while the second function separated the physical science and technical worker groups from the other four. Looking also at the

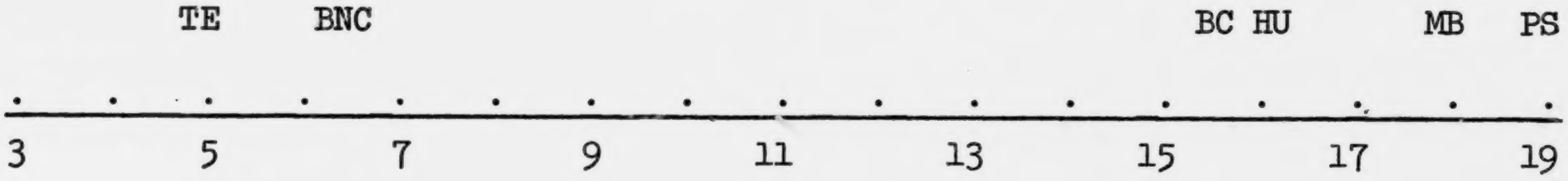
Table 9-10

Ability Discriminant Functions and Centroids

Variables Related to Function I		Loading[a]	Variables Related to Function II		Loading[a]
R-230	English Total	.83	R-270	Mechanical Reasoning	.63
R-250	Reading Comprehension	.82	R-282	Visualization in Three Dimentions	.51
R-105	Social Studies Information	.81	R-112	Mechanical Information	.44
R-340	Mathematics Total	.81	R-107	Physical Science Information	.34
R-106	Mathematics Information	.76	R-106	Mathematics Information	.32
R-102	Vocabulary	.74	R-230	Mathematics Total	.30
R-103	Literature Information	.71			
R-107	Physical Science Information	.79	R-115	Sports Information	-.27
R-104	Music Information	.64	R-103	Literature Information	-.18

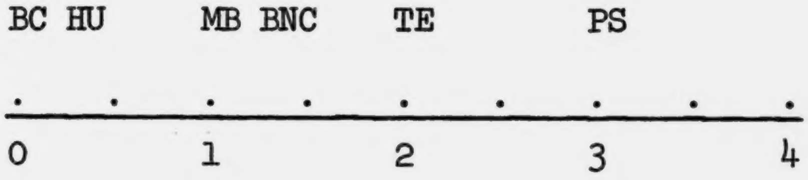
Centroids

Function I



Within Group Standard Deviation = 7

Function II



Within Group Standard Deviation = 3.6

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[a] Loadings here are correlations between the original ability variables and the derived discriminant functions.

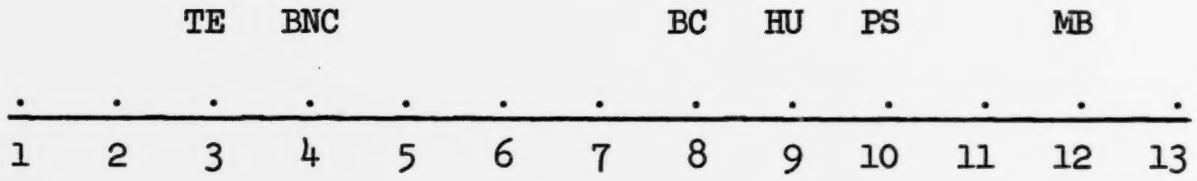
Table 9-11

Motive Discriminant Functions and Centroids

Variables Related to Function I		Loading	Variables Related to Function II		Loadi
P-701	Physical Science	.62	P-714	Mechanical-Technical	.5
P-702	Biological-Medical Science	.59	P-701	Physical Science	.4
R-610	Mature Personality	.49			
R-609	Self-Confidence	.33			
			P-705	Social Service	-.3
P-715	Skilled Trades	-.49	R-601	Sociability	-.3
P-717	Labor	-.47	P-703	Public Service	-.3
P-714	Mechanical-Technical	-.28	P-704	Literary Linguistic	-.3

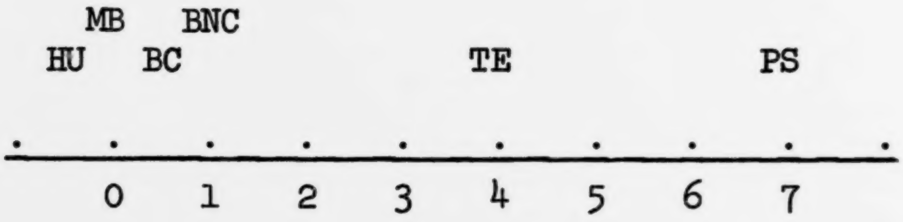
Centroids

Function I



Within Group Standard Deviation = 5

Function II



Within Group Standard Deviation = 6

variables which were primarily defining these two functions, we see they made considerable sense in terms of the types of separations produced.

Although examination of discriminant functions and centroids gives some indication of the nature of group differences, they do not tell how accurate the predictions are for individual students. As was pointed out above, only one-half of the boys of Table 9-1 were used in the actual discriminant analyses. The other half were set aside to be used as a cross-classification sample to see how well group membership could be predicted for a subsample not included in the determination of the prediction equations. Six probabilities (one for each of the six groups) were determined for each of the 2,926 boys in this sample. Group membership was predicted by assigning the boy to the group for which he had the highest probability. In other words, since probabilities tell us the relative group densities at and immediately around a boy's profile, our prediction was that a boy would join that group which most boys like him tended to join.

Tables 9-12 and 9-13 summarize the "hits and misses" for the ability and motive measures, respectively. In both cases, the predictions were based upon all five possible discriminant functions (one less than the number of groups). Of the 653 boys who had follow-up plans in the physical science area, over one-half (355) were correctly assigned membership in that group by the ability test information. Not all of the groups were so successfully classified by the ability information. Their overall hit rate was 38 per cent. The motive measures were a little more successful, classifying 42 per cent of the boys correctly.

When motive and ability scores were pooled with grade 9 plans as predictors of follow-up group membership, a 48 per cent hit rate was achieved. It should be remembered that these young men will continue to migrate from group to group over the next several years. We will expect, for example, that this hit rate will increase with the five-year follow-up criterion data.

Table 9-12

Predictions Using Ability Measures

Predicted Group Membership

		1	2	3	4	5	6	
Actual Follow-up Plans	1. PS	355	24	33	201	33	7	653
	2. MB	149	27	40	169	24	1	410
	3. HU	132	32	66	268	35	12	545
	4. BC	142	28	67	486	55	18	796
	5. TE	35	1	13	84	164	12	309
	6. BNC	14	0	21	88	75	15	213
		827	112	240	1,296	386	65	2,926

38 per cent hits

Table 9-13

Predictions Using Motive Measures

Predicted Group Membership

		1	2	3	4	5	6	
Actual Follow-up Plans	1. PS	387	50	38	137	37	4	653
	2. MB	110	137	34	116	11	2	410
	3. HU	120	63	156	169	29	8	545
	4. BC	146	61	107	417	61	4	796
	5. TE	61	6	25	74	133	10	309
	6. BNC	23	15	26	93	49	7	213
		847	332	386	1,006	320	35	2,926

42 per cent hits

Several observations should be made at this point:

(1) Although the ability measures increased in validity from grade 9 to the follow-up study while the motive measures decreased, the motive measures were still slightly better predictors of follow-up plans.

(2) Neither ability nor motive measures were better predictors than simply asking the ninth-grade boy what he wanted to become. Table 9-1 shows us that such self-predictions were 42 per cent accurate for this sample of boys, with respect to the six broad categories of plans.

(3) The value of the probability prediction system was not the number of hits achieved, but the fact that it could provide information to a boy about the proportion of boys like him who would eventually be members of different types of career plan groups.

The results of the analyses in this chapter clearly indicate that the TALENT battery does contain information which can be used in the ninth grade to assist the student in identifying those groups in which his probabilities of eventual group membership are the greatest and, conversely, those in which they are the least. This is the type of information students want and need as they develop plans for their vocational future. Chapter 11 will discuss in greater detail the guidance implications of these results. The next chapter will consider the extent to which the TALENT tests can distinguish among more specific types of career plan categories than were considered here.

Chapter 10

Redefining Career Plan Groups

William W. Cooley

In previous discussions of career plans in this report, broad categories of career groups have been used. These groupings seemed most appropriate, since we were dealing with the plans of young people only one year out of high school. But now that the five-year follow-up data are being collected, it is time to begin exploring the possibilities of making finer distinctions between career groups. In the first section of this chapter, we will compare the interests, temperament, and abilities of 22 groups planning careers in the science-technology area. Then, using these data, we will see whether a redefiniton of these criterion groups would improve prediction.

Major Differences among Groups

The 22 career groups studied and the number of young men with career plans in each of these categories one year after high school are shown in Table 10-1. Three of these groups require further explanation--"pharmacist," "pharmacy," and "engineer." If an individual specifically answered that he was planning to be a pharmacist, he was assigned the code 1541. If, however, he expected to "work in a pharmacy," he was given the code 1540. Both groups were included in the analyses to see whether the more general group differed from the specific one. Similarly, "engineer" was included along with the more specific categories in engineering. This section of the chapter will compare these 22 groups using 17 Interest Inventory scales, 10 temperament scales based on the Student Activities Inventory, and 19 ability measures. These data were collected in 1960 when the young men in our sample were tenth graders.

Table 10-2 presents the group with the highest mean and the lowest mean for each of the 17 interest measures. Also indicated is the relative predictive validity of the 17 scales using the univariate analysis of variance F ratio. A large F ratio here indicates that there was large variation among the 22 group means relative to the variation

Table 10-1

Science-Technology Career Plan Groups

Group	TALENT Code	Number of Grade 10 Males
1. Mathematician	1111	72
2. Chemist	1211	159
3. Physicist	1212	129
4. Geologist	1214	28
5. Engineer	1220	214
6. Civil engineer	1221	167
7. Electrical engineer	1222	507
8. Mechanical engineer	1223	253
9. Aeronautical engineer	1224	109
10. Chemical engineer	1225	106
11. Architect	1230	154
12. Draftsman	1291	210
13. Biologist	1310	62
14. Agricultural scientist	1320	41
15. Forester	1330	69
16. Physician	1400	435
17. Surgeon	1405	25
18. Dentist	1510	160
19. Veterinarian	1530	73
20. Pharmacy	1540	69
21. Pharmacist	1541	40
22. Psychologist	1620	133

Table 10-2

High and Low Groups for Interests

	Variable	High Group	Low Group	F Ratio[a]
P-701	Physical Science	Physicist	Agr. Sci.	20.6
P-702	Biol. Sci. and Med.	Surgeon	Draftsman	26.7
P-703	Public Service	Physician	Forester	6.5
P-704	Literature	Physician	Agr. Sci.	11.1
P-705	Social Service	Physician	Geologist	4.3
P-706	Artistic	Architect	Forester	5.5
P-707	Musical	Physician	Forester	5.3
P-708	Sports	Chem. Engineer	Physicist	2.7
P-709	Hunting and Fishing	Forester	Physicist	6.7
P-710	Bus. Management	Pharmacy	Physicist	3.5
P-711	Sales	Pharmacy	Geologist	3.9
P-712	Computation	Mathematician	Forester	7.1
P-713	Office Work	Chem. Engineer	Surgeon	3.0
P-714	Mech-Technical	Mech. Engineer	Surgeon	17.8
P-715	Skilled Trades	Draftsman	Surgeon	10.2
P-716	Farming	Agr. Scientist	Surgeon	13.4
P-717	Labor	Draftsman	Surgeon	7.5

[a] With $ndf_1 = 21$ and $ndf_2 = 2831$ an F-ratio larger than 1.88 is significant at the .01 level.

within the groups. The best single predictor in the interest area was the biological-medical science scale in which the surgeons scored highest and the draftsmen, lowest. Most of the group trends in this table were not surprising, but they did reinforce one's confidence in the interest measures and the criterion group coding by demonstrating the predictive validity of the measures. For example, physicians were highest on public service and social service, architects on artistic, foresters on hunting and fishing, pharmacists on business management, mathematicians on computation. Since the degrees of freedom involved in these F ratios were rather large, an F ratio of only 1.9 was significant at the .01 level. Therefore, we can be sure that the extreme groups were quite different on these 17 interest measures.

Turning to the 10 temperament scores from the Student Activities Inventory, though the F ratios were not nearly so large (Table 10-3), all but one were significant at the .01 level. One surprising result was the way in which the surgeons appeared to be quite high on many of these scales and the draftsmen low. This was probably related to a response bias which was previously observed in this Student Activities Inventory and which may be corrected by the development of factor scores in future analyses. Such a factoring should improve the interpretability of dimensions in this domain.

On the ability tests listed in Table 10-4 the physicists outperformed the other 21 groups on most of the scales while the draftsmen were the lowest group. There were exceptions to this trend, however. For example, the surgeons, not the physicists, scored highest on Music Information, the pharmacists on Sports Information, and the mathematicians on Arithmetic Computation and Clerical Checking. Scales for which the draftsmen were not lowest were Mechanical Information, Mechanical Reasoning, Visualization in Three Dimensions, Arithmetic Computation, and Clerical Checking.

The F ratios here show the very high predictive validity of the information scales, especially in the area of mathematics and science. This was rather surprising, since in this science-technology area it seemed reasonable to expect other types of variables to be more useful in making distinctions among careers. However the two math scores,

Table 10-3

High and Low Groups for Temperament

Variable		High Group	Low Group	F Ratio[a]
R-601	Sociability	Surgeon	Physicist	4.01
R-602	Social Sensitivity	Surgeon	Mathematician	5.83
R-603	Impulsive	(no significant differences)		1.48
R-604	Vigor	Agr. Scientist	Physicist	2.12
R-605	Calmness	Surgeon	Draftsman	3.78
R-606	Tidiness	Surgeon	Veterinarian	2.95
R-607	Culture	Surgeon	Draftsman	7.09
R-608	Leadership	Physician	Draftsman	3.99
R-609	Self-Confidence	Surgeon	Draftsman	4.42
R-610	Mature	Surgeon	Draftsman	6.98

[a] With $ndf_1 = 21$ and $ndf_2 = 2831$ an F-ratio larger than 1.88 is significant at the .01 level.

Table 10-4

High and Low Groups for Abilities

	Variable	High Group	Low Group	F Ratio[a]
R-102	Vocabulary	Physicist	Draftsman	19.7
R-103	Literature	Physicist	Draftsman	20.5
R-104	Music	Surgeon	Draftsman	14.8
R-106	Mathematics	Physicist	Draftsman	25.4
R-107	Physical Science	Physicist	Draftsman	22.2
R-108	Biological Science	Physicist	Draftsman	12.0
R-111	Electricity and Electronics	Physicist	Draftsman	19.0
R-112	Mechanics	Physicist	Psychologist	6.7
R-115	Sports	Pharmacist	Draftsman	9.1
R-134	Engineering	Physicist	Draftsman	5.1
R-135	Architecture	Physicist	Draftsman	6.3
R-230	English Total	Physicist	Draftsman	13.8
R-250	Reading Comprehension	Physicist	Draftsman	18.6
R-260	Creativity	Physicist	Draftsman	6.7
R-270	Mech. Reasoning	Physicist	Pharmacy	10.0
R-282	Vis. 3 Dimensions	Physicist	Pharmacy	9.9
R-340	Math Total	Physicist	Draftsman	24.9
F-410	Arith. Computation	Mathematician	Agr. Science	5.4
F-430	Clerical Checking	Mathematician	Geologist	2.3

[a] With $ndf_1 = 21$ and $ndf_2 = 2831$ an F-ratio larger than 1.88 is significant at the .01 level.

R-106 Math Information and R-340 Math Total, proved to be the best two ability predictors of group membership.

Now that we have examined the two groups which differed most on each of the variables, it might be useful to look at the differences among all of the groups on the variables producing the largest group differences. Table 10-5 presents the means for the 22 groups on the eight variables having the highest F ratios. The means in this table were rounded to the nearest whole number in order to simplify comparisons among groups. At the bottom of the table is the standard deviation based upon the pooled within-groups variance. Using this together with the difference between the highest mean and the lowest mean, one can see approximately how much separation is achieved by each of these eight variables.

Although it is easy to pick out the gross trends on this table, it is difficult to pick up the subtler ones. Of course, the situation becomes even more complicated when all 46 variables are together. Fortunately, techniques of multivariate analysis are available which enable us to reduce this large amount of information down to a more manageable number of dimensions. Tables 10-6 through 10-11 summarize the discriminant functions developed from analyzing each of the three domains (interest, temperament, and ability) separately by use of multiple group discriminant analysis.

In these tables two sets of information are presented. At the top of the table the approximate location of each of the groups on a discriminant function is indicated by locating the group name next to its group mean discriminant score. At the bottom of the table is indicated the relative contribution of the major predictors used to determine the group locations on that discriminant function.

In Table 10-6 is the first discriminant function developed from the 17 interest scores. The weighting system resulting from this analysis gave high positive weights to Biological Sciences Interest scores and negative weights to Physical Sciences, Mechanical-Technical, and Computational Interests. A high positive weight was also given to Literature Interest. The other 12 scales not listed were weighted between +.15 and -.15 and thus had little effect on a group's location on discriminant

Table 10-5

Major Differences among Science-Technology Groups

Variable	P-702 Biol Int.	R-106 Math Info	R-107 Phys. Sci. Info	P-701 Phys. Sci. Interest	R-102 Vocab Info	R-111 Elect Info	R-250 Read Comp.	P-714 Mech-Tech Interest
F Ratio	26.7	25.4	22.2	20.6	19.7	19.0	18.6	17.8
Group	Means							
1. Mathematician	22	14	12	28	16	10	38	18
2. Chemist	25	14	13	29	16	13	37	19
3. Physicist	24	17	15	31	17	15	41	19
4. Geolologist	20	14	13	26	15	11	38	19
5. Engineer	20	11	11	26	14	11	32	22
6. Civil engineer	20	13	12	27	15	10	35	20
7. Elect. engineer	21	14	13	28	15	13	35	23
8. Mech. engineer	20	13	12	28	15	12	35	24
9. Aero. engineer	22	14	13	30	16	12	38	22
10. Chem. engineer	25	15	13	30	16	12	38	20
11. Architect	20	12	11	24	15	11	34	19
12. Draftsman	16	8	9	21	12	9	28	23
13. Biologist	26	12	12	24	14	11	35	16
14. Agr. scientist	17	10	10	20	14	10	31	20
15. Forester	20	11	11	21	14	11	34	18
16. Physician	30	14	13	26	16	11	39	16
17. Surgeon	32	15	13	26	17	13	39	15
18. Dentist	26	12	11	24	15	10	35	17
19. Veterinarian	24	12	12	23	14	11	34	18
20. Pharmacy	25	11	11	24	14	9	32	18
21. Pharmacist	24	13	12	24	15	11	37	18
22. Psychologist	23	13	11	23	16	10	38	16
Std. Deviations (Pooled Within Groups)	8.9	4.2	3.3	7.3	3.0	4.0	8.4	7.3

Table 10-6

Interest Discriminant Function I

Discriminant Score Mean	Group
6	Physician, Surgeon
5	
4	
3	Psychologist
2	Biologist, Dentist
1	
0	Pharmacy, Pharmacist
-1	Veterinarian
-2	Chemist
-3	Forester
-4	Mathematician, Physicist, Chemical Engineer
-5	Geologist, Architect, Agricultural Scientist
-6	Civil Engineer, Aeronautical Engineer
-7	Engineer, Electrical Engineer
-8	
-9	Mechanical Engineer, Draftsman

Scaled Weight	Major Predictor Variables
.7	P-702 Biological Science and Medicine
.6	
.5	
.4	
.3	P-704 Literature
.2	
.1	
0	
-.1	
-.2	P-712 Computational
-.3	
-.4	P-701 Physical Science, P-714 Mechanical-Technical

function I. The groups having the highest positive discriminant score were those who were high on Biological Science and Literature Interest and low on the three scales negatively loaded. Therefore, the physicians and surgeons were at the top of the scale, and the mechanical engineers and draftsmen were at the low end.

The second interest function is summarized in Table 10-7. It is a physical science versus business management-farming bipolar function, with the physicists at the high end and the agricultural scientists, foresters, draftsmen, and veterinarians at the low end.

A third interest function (Table 10-8) used Farming Interest at the high end and Artistic Interest at the low end. This produced a separation of groups with veterinarians, agricultural scientists, and foresters having the highest discriminant scores and architects having the lowest. This discriminant function, together with the two discussed earlier, summarized most of the information contained in the original 17 interest scores regarding the differences among the 22 career plan groups.

Turning to the temperament measures, a single function summarized most of the information from these 10 scales (Table 10-9). The group separated most distinctly from the others was surgeons. Their high discriminant score on this function was obtained by having high scores on the Culture, Mature Personality, Self-Confidence, and Social Sensitivity scales, with relatively low scores on Tidiness, Sociability, and Vigor. Although this temperament domain did not exhibit a great deal of predictive utility for these science-technology groups, the significance of the trends should become of greater theoretical interest when we better understand the psychological factors involved in these 10 scales.

The two major functions obtained from the 19 ability measures are summarized in Tables 10-10 and 10-11. The first function, which used a general intelligence combination of math, science, literature, and reading comprehension abilities, did a rather good job of separating the physicists from the other groups. The other trends in this table were much in line with the overall general ability trends found in comparisons of the group means on each of the ability measures.

In the second ability discriminant function (Table 10-11) was a

Table 10-7

Interest Discriminant Function II

Discriminant Score Mean	Group
14	Physicist
13	
12	
11	
10	Mathematician, Chemist, Aeronautical Engineer
9	Electrical Engineer, Chemical Engineer
8	Mechanical Engineer, Physician
7	Surgeon
6	Geologist, Engineer, Civil Engineer, Psychologist
5	Architect, Biologist, Dentist, Pharmacy, Pharmacist
4	
3	
2	
1	Draftsman, Forester, Veterinarian
0	
-1	
-2	Argricultural Scientist

Scaled Weight	Major Predictor Variables
.8	P-701 Physical Science
.7	
.6	
.5	
.4	
.3	P-704 Literature
.2	
.1	
0	
-.1	
-.2	P-706 Artistic
-.3	P-710 Business Management, P-716 Farming

Table 10-8

Interest Discriminant Function III

Discriminant Score Mean	Group
13	Veterinarian
12	Agricultural Scientist, Forester
11	
10	Chemical Engineer
9	Mathematician, Chemist, Geologist, Civil Engineer
8	Engineer, Electrical Engineer, Mechanical Engineer, Biologist, Dentist, Pharmacy, Pharmacist
7	Aeronautical Engineer, Physician, Surgeon
6	Physicist
5	Draftsman
4	Psychologist
3	
2	Architect

Scaled Weight	Major Predictor Variables
.5	P-716 Farming
.4	
.3	P-701 Physical Scientist
.2	P-702 Biological Science, P-709 Hunting, P-712 Computation
.1	
0	
-.1	
-.2	P-710 Business Management, P-714 Mechanical-Technical
-.3	
-.4	
-.5	
-.6	P-706 Artistic

Table 10-9

Temperament Discriminant Function I

Discriminant Score Mean	Group
7.0	Surgeon
6.5	
6.0	
5.5	Physicist, Physician
5.0	Aeronautical, Architect, Psychologist
4.5	Chemist, Electrician, Mechanics, Chemical Engineering, Biologist, Agricultural Scientist, Dentist
4.0	Mathematician, Geologist, Engineer, Civil Engineer, Forester, Veterinarian, Pharmacy
3.5	Pharmacist
3.0	Draftsman

Scaled Weight	Major Predictor Variables
.5	R-607 Culture, R-610 Mature
.4	R-609 Self-Confidence
.3	R-602 Social Sensitivity
.2	
.1	
0	
-.1	
-.2	R-606 Tidiness
-.3	R-601 Sociability
-.4	R-604 Vigor

Table 10-10

Ability Discriminant Function I

Discriminant Score Mean	Group
21	Physicist
20	
19	
18	Chemical Engineer, Surgeon, Physician
17	Mathematician, Chemist
16	Aeronautical Engineer, Electrical Engineer, Geologist, Psychologist
15	Pharmacist, Civil Engineer, Mechanical Engineer
14	Biologist, Dentist, Veterinarian, Architect
13	Engineer, Pharmacy, Forester
12	
11	Agricultural Scientist
10	
9	Draftsman

Scaled Weight	Major Predictor Variables
.4	R-106 Mathematics, R-107 Physical Science, R-340 Mathematics Total
.3	R-111 Electrical Information, R-103 Literature Information
.2	R-250 Reading Comprehension
.1	
0	
-.1	
-.2	R-270 Mechanical Reasoning
-.3	
-.4	R-111 Mechanical Information

Table 10-11

Ability Discriminant Function II

Discriminant Score Mean	Group
2.0	Electrical Engineer, Physicist
1.5	Mechanical Engineer
1.0	Aeronautical Engineer, Chemical Engineer, Architect
0.5	Engineer, Chemist, Civil Engineer, Draftsman
0.0	Agricultural Scientist, Forester
-0.5	Veterinarian, Mathematician, Geologist
-1.0	Surgeon
-1.5	Pharmacist, Pharmacy, Dentist, Physician
-2.0	Biologist
-2.5	
-3.0	Psychologist

Scaled Weight	Major Predictor Variables
.4	R-111 Electrical Information, R-340 Mathematics Total
.3	R-270 Mechanical Reasoning, R-282 Visualization 3 Dimensions
.2	R-112 Mechanical Information
.1	
0	
-.1	
-.2	R-103 Literature Information, R-108 Biological Information, R-230 English Total
-.3	R-104 Music Information, R-250 Reading Comprehension

combination of Electrical and Electronic Information, Mathematics Information, Mechanical Reasoning, Visualization in Three Dimensions, and Mechanical Information weighted positively with the more verbal abilities--Literature, English, Reading Comprehension and Music Information--weighted negatively. This function placed the physical scientists and engineers on the high end, and the more people-oriented groups at the low end. Together these two ability discriminant functions accounted for most of the discriminating information available in the 19 ability measures used in this analysis.

Improving the Criterion

Now that we have seen the major differences between these 22 career groups, we are still faced with the task of redefining them so that predictions can be improved. In an attempt to summarize the critical information resulting from the analyses reported earlier, Table 10-12 was constructed. Above the diagonal line is listed the number of the Project TALENT variable which best discriminated between the two groups corresponding to a particular cell in that table. For example, the cell formed by row 1, mathematicians and column 3, physicists contains a -111. Variable 111 is the Electricity-Electronics Information scale. This means that the major way in which mathematicians differed from physicists was their performance on this particular test. The minus sign indicates that the mathematicians had poorer scores than the physicists. That is, a minus sign preceding the variable number in a cell indicates that the column group designation was higher than the row group designation.

Continuing across the mathematician row, the next test number is 340 under column 5. This indicates that the mathematicians were higher than the engineers on the Mathematics Total scale and that this difference was the major way in which the mathematicians differed from the engineers. Further study of this table shows that mathematicians differed from electronic engineers on the Electricity-Electronic Information scale, from mechanical engineers on the Mechanical-Technical Interest scale, from architects on the Art Interest scale, from draftsmen and biologists on the Mathematics Total scale, from agricultural scientists on the Farming Interest scale. Thus, the major difference between any pair of groups can be found above the diagonal of Table 10-12.

In the area of Table 10-12 below the diagonal is indicated an A, an I, or a T, depending upon whether or not abilities, interests, or temperament, respectively, produced no significant difference for that group pair at the .01 level. Thus an A at the intersection of row 4 (geologists) and column 1 (mathematicians) indicates that there were no significant differences in ability between the geologists and mathematicians. The T in row 2, column 1 indicates that there were no significant temperament differences between chemists and mathematicians. The I in row 6, column 5 indicates that there were no significant interest differences between civil engineers and "undeclared" engineers. The large number of A's and T's in the geology column suggests that the geologists were indistinguishable from most of the other groups in terms of ability and temperament. Some group pairs could not be distinguished from each other on any of the three domains. Civil engineer and geologist, veterinarian and agriculture scientist, and pharmacy and pharmacist are examples of these pairs. The fact that there are no A, I, or T designations in the physics row or column indicates that the physicists were significantly different from all of the other 21 groups in all three tested domains.

As these analyses have shown, the pooling of two groups depends upon what types of variables you are talking about. In terms of ability, for example, there were no apparent differences between surgeons and aeronautical engineers, but the two groups differed somewhat in interest and temperament.

Two suggestions for redefining criterion groups also emerge from this table. One is obviously the elimination of the distinction between pharmacy and pharmacist, since there were no differences between the two groups on any of the variables. Another is to form a group cluster composed of veterinarians, agricultural scientists, and foresters, where no differences were found. However, it is not so easy to deal with geologists, since they looked like biologists, civil engineers, and foresters; yet, for example, civil engineers did not really look

Table 10-12

Summary of Major Group Differences and Similarities

	Math 1	Chem 2	Phys 3	Geol 4	Eng 5	Civil 6	Elect 7	Mech 8	Aero 9	Chem 10	Arch 11
1. Mathematician			-111		340		-111	-714			-706
2. Chemist	T		-111		107	702	-714	-714			-706
3. Physicist				111	107	111	107	107	111	111	107
4. Geologist	A T	A T									
5. Engineer	T			A T			-111	-112	-107	-340	-706
6. Civil engineer	A			AIT	I		-111			-340	-706
7. Elect. engineer				A T						-115	-706
8. Mech. engineer	T	T		A T	I		T			-340	-706
9. Aero. engineer				A T			I	A			701
10. Chem. engineer	A	A		A							340
11. Architect				A T	A				A		
12. Draftsman				T							
13. Biologist				AIT							
14. Agr. scientist	T	T		T	A	T		T			
15. Forester				AIT	A T						
16. Physician				A							
17. Surgeon		A		A	A				A		
18. Dentist				A							
19. Veterinarian	T			A T	A T	A				T	
20. Pharmacy				A	A						
21. Pharmacist	T			AI	A	A T			A		
22. Psychologist				A T							

Table 10-12 (cont.)

Summary of Major Group Differences and Similarities

		Draft 12	Biol 13	Ag Sci 14	For 15	Physic 16	Surg 17	Dent 18	Veter 19	Phar 20	Phar 21	Psych 22
1.	Mathematician	340	340	-716	712	-702	-702	340	-716	340		712
2.	Chemist	106	340	-716	701	-703		107	-716	107		701
3.	Physicist	106	340	-716	701	111		111	-716	111	340	111
4.	Geologist	106				-702	-702					
5.	Engineer	106	714	-716	701	-702	-702	-702	-716			-103
6.	Civil engineer	340	-702	-716	701	-702	-702	-702	-716			714
7.	Elect. engineer	106	714	-716	701	-702	-702	111	-716	111		714
8.	Mech. engineer	106	714	701	701	-702	-702	714	714	282		714
9.	Aero. engineer	102	270	-716	701	-702	-702	701	-716	282		701
10.	Chem. engineer	340	340	701	701	-702		340	701	340	340	710
11.	Architect	106	-702	-716	-716	-702	-702	706	-716	282		282
12.	Draftsman		-702	-716	-108	-702	-702	-702	-108	-702	-115	-103
13.	Biologist			-716		-340			-716			
14.	Agr. scientist		T			-702	716	716		716	716	716
15.	Forester		A	A T		-702	716	716		716		716
16.	Physician							107	-716	340		702
17.	Surgeon		I			AI			-716			
18.	Dentist			A			I		-716			
19.	Veterinarian		A	AIT	AIT					716	716	716
20.	Pharmacy		AI	A T	A		AI	AI	A			
21.	Pharmacist		AI		A	A		AI	A	AIT		
22.	Psychologist						A	T			A	

like biologists. The problem here, of course, is that geologists are a rather heterogeneous group, located near the middle of the science-technology space, with portions of the group overlapping engineering and other portions overlapping biology and forestry. In this group many types of work are possible, from geological survey work to chemical analysis of rock composition to paleontology, which comes close to biology. What we need to do is to divide this group along functional differences, assigning geologists to a variety of groups depending upon their more specific statement of what they do. This, of course, is true of any occupational category which actually describes a broad range of possible types of positions. "Armed Forces" is another example of such a category.

The analyses reported here in Chapter 10 were intended to *illustrate* one line of research which we expect to carry out using the results of the five-year follow-up studies. Our hope is that a continuing effort at purifying the criterion groups will eventually result in our being able to provide much more specific information to high-school students who seek advice in planning their careers. Chapter 11 further discusses Project TALENT's attempts to aid students in the career choice process.

Chapter 11

Implications for Guidance

William W. Cooley and Paul R. Lohnes

A computer measurement system (CMS) for guidance programs in American schools was proposed in an earlier article (Cooley, 1964). That paper emphasized the inevitability of partial automation of guidance services because of the sheer magnitude of the guidance task, in terms of numbers of students to be served and volume of information to be retrieved and processed. The proposed CMS depends on the employment of multivariate statistical strategies to analyze results of continuous, normative, longitudinal researches, yielding dynamic norms. It also depends on the presence in schools of adequate records of test and inventory scores and of computer access. All four of these ingredients from which a CMS can be engineered are now available. Multivariate methods are becoming commonplace in educational research. Project TALENT is maturing as a longitudinal norming study. Improvements in testing are widespread (e.g., the Carnegie Foundation's National Assessment Program headed by Ralph Tyler), and multi-channel, time-sharing computers require only local consoles at the ends of leased telephone lines in the schools to provide economical computer access. This chapter expands on functions a CMS can perform in a school and delineates by examples some of the actual design solutions which can be obtained.

Guidance programs attempt to help students with (1) problems of adjustment to the demands of present and immediate future circumstances and (2) problems of planning for the long-range future. The main problem of the first type on which guidance bears is adjustment to school. A major problem of the second type on which guidance concentrates is vocational planning. In guidance circles today this problem is often spoken of as the need for career planning, to emphasize that more is at stake than the securing of and adjusting to an appropriate first work position. For almost half our young people leaving high school today, the first stage of career planning is planning for college. Indeed, it can be argued that the real first stage of career planning occurs in the junior high school, under the guise of planning for high school. In this sense the two types of problems, school problems and vocational problems, overlap and tend to merge into one category.

The published Project TALENT results (see References) contribute a great deal to our efforts to understand problems of school adjustment and contain some practical hints on how to cope with some such problems. These findings reveal more clearly and in more detail than have any previous studies the vastness of the facts of individual differences in the student population. The fact that youth displays such diversity of abilities, interests, motives, and family backgrounds, as revealed in the TALENT data, raises many questions about the four or five-track curriculum systems and grade placements now considered adequate. There is a strong hint that schools need to do more adjusting to their students before expecting them to adjust to school. We may need a degree of individualization of curriculum and guidance which can be achieved only through computer management of instructional sequences and guidance experiences. Guidance attempts to help with school adjustment are now hindered by the present form and content of student cumulative records.

One of the functions of a CMS would be the renovation of student cumulative records. Student cumulative records as they now exist are unprofessional because they do not reflect the educational psychology which is the scientific basis for an educator's professional understanding of his students. There is a working consensus in American educational psychology today on the general features of an appropriate descriptive theory of the human personality. Teachers-in-training learn that theory from their educational psychology textbooks. When they report on the job, they find that schools are operated on an atheoretical basis. Specifically, the cumulative record is maintained as a hodgepodge of descriptive categories, some of them archaic survivors from prepsychology (i.e., teachers' marks in subject areas) and some a veneer of psychological constructs (i.e., test scores, especially on aptitude and interest batteries). The student cumulative record is one of the best opportunities in school practices for educators to act like professionals by incorporating their documentation on their students within a framework provided by a modern, scientific theory of the student. Right now, when the better managed of our larger school systems are going over to automatic data processing of student cumulative records, is the ideal time to innovate in the design of those records.

American psychology has brought trait-and-factor psychology to a very high level of development and has proven the utility of the theory, but you would never guess it to look at school records. Any layman with modest clerical aptitude who knew that schools collect teachers' marks, test scores, and attendance reports on children could design a replica of the cumulative record forms now in use. Yet we could have a school record form in which information on a student would be organized in a framework provided by and testifying to a coherent theory of the student's personality. It would show how to emphasize the important distinguishing characteristics of the student, and how to discard the trivial distinctions. Just as the family doctor knows a youngster in a professional way, in which even his parents do not know him, this theory would enable the educator to develop a specialized knowledge of the student which even his parents do not have.

It may be that one of the reasons trait-and-factor psychology has not had more influence on student records is that trait-and-factor psychology is a generic term standing for quite a few somewhat contradictory and competing specific theories. Students of the subject have been able to discern the outlines of a working consensus among the majority of American educational psychologists, but the in-service educator has not been given a single, clear-cut model of human personality by the psychologists he reads. Project TALENT possesses the first set of really adequate data for the construction of a specific trait-and-factor theory of adolescent personality of sufficient comprehensiveness and relevance to allow the engineering of a solution to the cumulative record problem. In other words, the basis for a theory-derived student record form has been in the literature for some years, but it would have been an effort to extract a specific, coherent, and workable design. We are engaged in a program of factor analytic research on the TALENT data which will provide a definite, functional design for a theory-informed cumulative record suitable for management by a CMS.

A few details on the factor theory to which our research has led us may be of interest. We began with 60 ability scales and 38 interest and self-description scales for 20,000 subjects divided among both sexes and grades 9 and 12. This was a 10 per cent sample of the Project TALENT national probability sample for these two grades. The intercorrelations among these 98 scales are moderate to high, and we felt that a parsimonious set of uncorrelated factors could convey most of the measurement variance of this large battery which is relevant to the career criteria we are currently considering. We chose to create a factor structure separately for each of the two domains of scales, the 60 abilities and the 38 motive scales. Canonical correlation was used to display the interdependencies between ability and motive factors. Our approach to handling variance due to sex and grade was to correlate these two status variables with the measurement scales for total sample, then to pass a first factor in each domain right through sex and a second factor right through grade. We found that the varimax did a good job of locating meaningful positions for our other factors. We are now converting large files of data to factor scores on a set of 13 ability factors and 13 motive factors. The most important ability factors are Verbal Knowledges, Grade, English Language, Sex, Visual Reasoning, Mathematics, and Perceptual Speed and Accuracy. The most important motives are Conformity Needs, Sex, Business Interests, Outdoor and Shop Interests, Scholasticism, Cultural Interests, and Science Interests. We think that prediction studies from the base of these factors will be much easier to interpret than studies based on 98 highly redundant scales. Also, the factor scores will be much more reliable than the original scale scores, an important consideration for the guidance of individual students.

A second and related function for a CMS is the management of student appraisal. Student appraisals are on a poor basis in our schools, but the progress achieved after half a century of research and development in educational measurement is beginning to be unavoidable. It is especially desirable to eliminate the need for teachers to make global, end-of-term assessments of student accomplishments. Teacher observations can contribute more useful, reliable information to the CMS if they are based upon more adequately and specifically defined observational schemes. The CMS can then analyze and synthesize this week-to-week information, and together with the results of the school measurement program, arrive at a report of student progress which can convey much more information than the present report card grading system does.

If a CMS foreshadows an efficient and professional appraisal of student progress, it foreshadows an important breakthrough in another problem area, which is the evaluation of curriculum and staff provisions. Some curricula and some teachers are surely more productive than others. A scientific appraisal system is the key to a scientific evaluation of the differential productivity of both curriculum and staff alternatives. The time has come for educational administration to begin to pay for educational goods and services in proportion to the value of what is rendered. There will always be value judgments involved in the justification of purchases and salaries, but these value judgments can be based on much sounder and more complete information than they are now.

A computer measurement system would also be useful in the long-range guidance program area, in dealing with the problem of how to give each student a good projection of his possible vocational futures. Note that we do not speak of the problem of fitting the student to a specific vocational future. We speak of projecting for the student his multi-potentialities, or we might say, his opportunities, leaving it to him to select his own specific goals, but making it possible for him to arrive at decisions in the light of necessary relevant information. The truest payoff of the Project TALENT follow-up studies will be the establishment of the predictive validities of appraisals of adolescents against long-range vocational adjustment criteria which will make the projection of vocational potentials in school guidance programs possible.

Chapter 8 is evidence on the extent to which career aspirations change during adolescence and of the extent to which changes of aspirations may be forced by circumstances in the environment. Classifying career plans in terms of 31 categories, such as mathematician, farmer, salesman, etc., we found that career plans changed more extensively between high school and the year following high school than most people would have guessed. For example, of the twelfth-grade boys planning careers in engineering, only 35 per cent still had similar plans one year later. Of twelfth graders planning careers in business, 26 per cent continued to hold those plans during the one-year follow-up. Overall stability of career plans ranged from 31 per cent for twelfth-grade males to 17 per cent for ninth-grade males, and from 41 per cent for twelfth-grade girls to 26 per cent for ninth-grade girls. This means that only 17 per cent of the ninth-grade boys had the same general career plans one year out of high school as they had as ninth graders in high school. This is certainly relevant information for a CMS.

Although we do not envision a system which forces youngsters into early realignment of their aspirations, we do hope to inform them of their probabilities of membership in different career groups in the light of their measured attainments on appropriate occasions. We have been doing some research which bears on the question of how a school appraisal system linked with follow-up data could issue useful predictions of career opportunities to youngsters.[1] We have grouped male occupations into six categories (see Chapter 9 for more detail):

1. Physical Science
2. Medicine, Biology
3. Humanities and Social Service
4. Business (College)
5. Technology (Noncollege)
6. Business (Noncollege)

On the first follow-up questionnaire, boys one year out of high school indicated an occupational aspiration from which they can be placed in one of these six groups. From a study of a sample of the aspirations of 3,000 boys, we have determined that probability of post-high-school membership in these categories can be obtained from a set of 50 ninth-grade TALENT measures, which include tests of: (1) abilities (maximum performance tests covering reading comprehension, creativity, mechanical reasoning, visualization, abstract reasoning, English, mathematics memorization, etc.), (2) motives (typical performance scales including interest and activities scales), and (3) ninth-grade career plans. The practical application of this finding is that a school measurement system similar to the TALENT measurement system could take scores on a boy and return to him a probability of future membership in each of these six occupational aspiration categories. These probabilities would sum to one. A particular boy might get this set of probabilities:

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[1] Cooley, W. W. Hummel, R. and Lohnes, P. R. An example of computer-assisted counseling (In Draft).

1. Physical Science = .70
2. Medicine, Biology = .03
3. Humanities = .02
4. Business (College) = .04
5. Technology = .20
6. Business (Noncollege) = .01

This information returned by a computerized guidance system does not tell the boy that he must become a physical scientist. It informs him that in a group of boys who share his measured characteristics, one year out of high school most plan to be physical scientists, some intend to be technicians, and very few plan to be businessmen (college), business (noncollege), medicine and biology, or humanities oriented. He is not forced to react to this information in any particular way, but he may choose to incorporate the information intelligently into his planning for his future.

The question of whether or not the TALENT battery contains valid information for career planning has been explored in different ways. The most convincing demonstration thus far has been a study of the 36 criterion groups which result from classifying both ninth-grade plans and follow-up plans into a six-by-six table based on the six career plan categories indicated above, resulting in 30 groups of specific types of changers and six groups for whom career plans were stable. The results indicated that the group who changed from plan A to plan B, for example, look more like the stable group of B planners than the stable A planners, in terms of TALENT profiles. In other words, the TALENT tests are related to the types of changes in career plans which took place during those four years. Thus, a CMS utilizing this type of information is relevant for career planning and the educational decisions that are based on those plans.

Project TALENT can, therefore, provide predictive validities of high school measures against career development criteria. It can also provide a model for career follow-ups. It is unclear whether there should be proliferation of follow-up studies in local school districts, or whether the Office of Education should be asked to establish a permanent, central agency charged with the responsibility to conduct follow-up studies systematically and to package predictive validities for local guidance programs. Perhaps it would be best if we had both central and local efforts.

We are now ready to phrase the key concept of this chapter which ties our remarks to the guidance function. The key concept is that planning for the immediate educational experiences of a student should be conducted in an information-environment which allows the plans to be joint functions of the long-range purposes and goals of the student, the known requirements for achievement of those goals, the appraised educational aptitudes and attainments of the student, the appraised interests and other relevant learning sets of the student, the appropriateness of the students long-range goals in the light of the above and other considerations, and the curriculum and staff resources of the school. This concept implies a unique educational plan for each student, and one which is periodically adjusted. It implies a complete merging of the curriculum and guidance functions in the school. It calls for a system of individualized and monitored learning prescriptions. It calls for a radically renovated school in which a computer measurement system is operative in all planning activities. It returns the teacher to the role of tutor which is at the heart of teaching. It makes grade levels and curriculum tracks obsolete. It is not farfetched. Some experiments of this sort are now in progress. The concept of individualized education will govern in tomorrow's schools. Our license for speaking to this concept derives from the aspiration of Project TALENT to make a major contribution to the engineering of the required measurement system.

Many advantages can accrue from a school computer-measurement system. Through local follow-up studies we will gain meaningful productivity indices for our schools. We will actually know what happens to our products in the marketplace and will be able to adjust our school resources to fill obvious gaps which appear. We will receive important assistance in planning staffing, equipment purchasing, and space needs. We will be able to improve our continuation services, such as adult education and transcript transmittal. We may even choose to provide continuing vocational guidance services to our alumni.

What we have described is, physically, a school which is organized around a computer measurement system. Philosophically, it is a school which provides for individually planned and monitored education for each student. The scientific paradigm for this school is the cybernetic loop in which measurement is a continual process, and there is regular feedback of analyzed information to the control agents, including the student himself, which enables periodic updating of all educational decisions and plans for the student.

Project TALENT's promise to guidance is to assist in the development of a school computer measurement system which will take charge of: (1) the student cumulative record, (2) the student progress report, (3) the appraisal of educational productivity of curriculum and staff, (4) the projection of vocational potentials for students, (5) the periodic monitoring of individual learning prescriptions, and (6) the management of several kinds of continuation services to alumni. TALENT's contribution will include the phrasing of a comprehensive, coherent trait-and-factor theory of adolescent personality; the delineation of a measurement system related to that theory; the establishment of predictive validities for that measurement system against career and life adjustment criteria from long-range follow-ups of a large probability sample; the packaging of computer programs for the data processing and analytical operations of a school measurement system; and an effort through content analysis of school courses, achievement tests, and vocational positions to synthesize the common elements of curriculum and guidance sciences.

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Appendix A

Follow-up Questionnaires

Mailed Questionnaires (Regular)	Starting Date	Page
Grade 12 (Class of 1960)	June, 1961	A-2
Grade 11 (Class of 1961)	May, 1962	A-9
Grade 10 (Class of 1962)	December, 1963	A-12
Grade 9 (Class of 1963)	August, 1964	A-15

Nonrespondent Survey Questionnaires (Special)	Page
Grade 12	A-18
Grade 11	A-20
Grade 10	A-24
Grade 9	A-26

PROJECT TALENT
UNIVERSITY OF PITTSBURGH
PITTSBURGH, PENNSYLVANIA 15213

12 May 1961

Dear Project TALENT Participant:

First, we want to thank each of you for your help in the testing phase of Project TALENT last spring. We have heard from many of the students that the ten to twelve hours of testing was hard work but interesting. It was vital to the nation's welfare to gather these facts about you and your schools.

In December we sent lists of your scores on the Project TALENT tests to your school. The results are now being studied at our Computing Center and by next fall the first in a series of reports on talents and their development will be available to the public. In a few weeks some newspaper and magazine stories on Project TALENT will be published. But these stories will only describe the beginning of this important research program. Your help is needed to get the facts for the next chapter in the story.

We need to know what has happened to you in the past year and what your plans are now. The questions on our questionnaire have been prepared so that most of them can be answered by just checking the choice that describes what you've been doing. So this time, we will need only fifteen or twenty minutes of your time. However, please write in comments wherever you think some explanation is needed. Your answers will, of course, be kept in complete confidence. Neither you nor your school will be identified in any way when we publish our findings.

When you finish marking the choice for the questions, please sign your name on page seven, fold the booklet so that our name and address are on the outside, and mail it back to us. The stamp has already been attached.

The members of the Project TALENT staff greatly appreciate your personal help in this program. We wish you success in carrying out your plans.

Sincerely,

John C. Flanagan

John C. Flanagan
Professor and Director of Project TALENT

THERE ARE FOUR PARTS TO THIS BOOKLET. IF YOU HAVE NEVER ATTENDED COLLEGE YOU NEED ANSWER ONLY THE FIRST THREE PARTS PRINTED IN BLUE.

YOU CAN PROBABLY FILL OUT THIS FORM IN ABOUT 15 MINUTES

PLEASE DO NOT WRITE IN THIS AREA.

__ __ __

Today's Date ______________________
Month Day Year

Date of Birth ______________________
Month Day Year

Check one:
1 ☐ Male
2 ☐ Female
9

In the spaces below, please print the name and address of someone who is most likely to know your address at any time:

Name ______________________
Address ______________________
City ______________ State ________

DIRECTIONS:
Please be sure to answer every question below. Most of the questions can be answered by just marking an X in the box to the left of the answer you choose. Do not skip any questions. Mark only one answer to each question except where instructed to mark more than one.

PART I. *EDUCATION*

PLEASE DO NOT WRITE IN THIS AREA.

1. Did you graduate from high school?
1 ☐ Yes
0 ☐ No
9

2. Have you attended college since leaving high school?
1 ☐ Yes, as a full-time student.
2 ☐ Yes, as a part-time student.
3 ☐ Yes, I entered but have dropped out temporarily.
4 ☐ Yes, I entered but dropped out and do not plan to return.
5 ☐ No, but I plan to enter college within a year or two.
6 ☐ No, but I plan to enter college eventually; I have no idea when.
7 ☐ No, and I have no plans to do so.
9

3. Since leaving high school have you attended a school other than a college?
1 ☐ Yes, as a full-time student.
2 ☐ Yes, as a part-time student.
3 ☐ No, and I have no plans to do so.
4 ☐ No, but I plan to get some more non-college schooling.
9

4. Which of the following kinds of school diploma or certificate do you plan to obtain? (Mark as many as apply.)
0 ☐ No further schooling planned
1 ☐ A college degree (4 years or more of college)
2 ☐ A junior college diploma or degree
3 ☐ R.N. (Registered Nurse Certificate)
4 ☐ Practical nursing certificate
5 ☐ A business school or secretarial diploma
6 ☐ Diploma or certificate based upon apprenticeship training, on-the-job training, or technical or trade school. Please describe:
____
(__) 9 ☐ Other. Please specify: ______________________
____
0

PLEASE DO NOT WRITE IN THIS AREA.

5. What kinds of school have you attended since leaving high school? (Mark as many as apply.) Please fill in name and location below.
Z ☐ None
A ☐ A college offering bachelor's degree or higher
BZ ☐ A junior or community college
CZ ☐ A technical institute
D ☐ A school of nursing (3-yr. program)
J ☐ A school of practical nursing
K ☐ A business school
L ☐ A trade school
M ☐ An armed forces enlisted school
R ☐ Other
Z

Name and location of present or most recent school attended since leaving high school.

School ______________________
City ______________ State ________

PLEASE DO NOT WRITE IN THIS AREA.

6. Answer this question if you have *never* attended college.
Did you WANT to go to college?

NO
A ☐ No, I wanted to earn money.
B ☐ No, I wanted to get married.
C ☐ No, I wanted to go into the military service at once.
D ☐ No, I was more interested in going to some other kind of school.
I ☐ No, for some other reason than above. Please specify: ______________________
____

YES
J ☐ Yes, but I couldn't afford it.
K ☐ Yes, but I couldn't because of a family emergency.
L ☐ Yes, but I couldn't because I was married.
M ☐ Yes, but I wasn't qualified because I hadn't taken college preparatory courses required for admission.
N ☐ Yes, but I didn't apply because my grades weren't good enough.
O ☐ Yes, I applied but wasn't accepted.
R ☐ Yes, but I didn't go for some other reason. Please specify:
____
Z

PART II. *WORK EXPERIENCE*

7. What is your Social Security number?

__ __ __ - __ __ - __ __ __ __

If none, check here ________

Questions 8-14 refer to the FIRST full-time job you had after leaving high school. Include summer jobs or other temporary jobs you had after leaving high school, if they were full-time.

8. How many different full-time jobs (35 hrs. per week) have you had since you left high school?

0999 ☐ None
1 ☐ One
2 ☐ Two
3 ☐ Three or more
9

PLEASE DO NOT WRITE IN THIS AREA.

If your answer to the above question was "None", please skip to Question 15. Otherwise answer Questions 9-14.

9. How long did it take you to find the first full-time job you had since high school?

0 ☐ I found it before I left high school
1 ☐ Less than a week
2 ☐ 1 to 2 weeks
3 ☐ 2 to 4 weeks
4 ☐ 1 to 2 months
5 ☐ 2 to 4 months
6 ☐ 4 to 6 months
7 ☐ Longer than 6 months
9

10. When did you start this first full-time job?

0 ☐ Before May 1960
1 ☐ In May or June 1960
2 ☐ In July or August 1960
3 ☐ In September or October 1960
4 ☐ In November or December 1960
5 ☐ In January or February 1961
6 ☐ In March or April 1961
7 ☐ In May or June 1961
9

PLEASE DO NOT WRITE IN THIS AREA.

11. How did you get your first full-time job?

0 ☐ Through a friend or relative
1 ☐ Through my high school
2 ☐ Through another school
3 ☐ Through a union or bargaining group
4 ☐ Through the U. S. Employment Service
5 ☐ Through another public employment agency
6 ☐ Through a private employment agency
7 ☐ By answering an advertisement
8 ☐ By applying directly to a person or company that might be hiring
(__) ☐ Other. Please specify: __________________

____
9

12. What was your starting pay (before deductions), on your FIRST full-time job? Fill in ONE of the lines below.

5**** **$**________________ **per week**
OR
1**** **$**________________ **per month**
00000

13. What was your job called?

____

14. What did you do on this job? Please be specific:

____

____

PLEASE DO NOT WRITE IN THIS AREA.

15. Did you have a paid job in May, 1961?

1 ☐ Yes, a full-time job (35 hours per week or more)
2 ☐ Yes, part-time work (less than 35 hrs. per week)
3 ☐ No, but I was looking for a full-time job.
4 ☐ No, but I was looking for part-time work. (I did not want a full-time job.)
5 ☐ No, I was going to school, and did not want a job.
6 ☐ No, I am a housewife, and was not looking for an outside job.
7 ☐ No. I was not looking for a job for reasons other than those listed above.
9

Answer Questions 16-20 ONLY if you had a full-time job in May, 1961. Otherwise skip to Question 21.

16. What was your pay (before deductions), on this full-time job? Please fill in ONE of the lines below.

5**** **$**________________ **per week**
OR
1**** **$**________________ **per month**
00000

17. What is the job called?

____

18. Tell what you do (or did) on this job. Please be specific:

____

____

PLEASE DO NOT WRITE IN THIS AREA.

19. How well do (or did) you like this type of work?

3 ☐ Very well
2 ☐ Fairly well
1 ☐ Not very well
0 ☐ Not at all
9

20. How long do you plan to stay in the same type of work?

4 ☐ I plan to make it my career.
3 ☐ At present I have no plans to change.
2 ☐ Probably a few years.
1 ☐ I plan to change soon.
9

21. About how long were you unemployed (and looking for a full-time job) between June 1, 1960 and June 1, 1961?

R ☐ I did not want a full-time job.
A ☐ Not at all
B ☐ Less than a week
C ☐ 1 to 2 weeks
D ☐ 2 to 4 weeks
E ☐ 1 to 2 months
F ☐ 2 to 4 months
G ☐ 4 to 6 months
H ☐ More than 6 months
Z

PLEASE DO NOT WRITE IN THIS AREA.

22. In regard to jobs or careers, which ONE of the following is most important to you? Please mark only ONE.

MOST IMPORTANT (Please mark only one.)

A ☐ Starting salary
B ☐ Future salary
C ☐ Working conditions
D ☐ Job security
E ☐ Good supervisors
F ☐ Good fellow-workers
G ☐ Importance of work
H ☐ Opportunity for promotion
I ☐ Good fringe benefits
J ☐ Serving others
K ☐ Personal interest in work
Z

23. In regard to jobs or careers, which ONE of the following is the NEXT MOST IMPORTANT to you?

NEXT MOST IMPORTANT (Please mark only one.)

A ☐ Starting salary
B ☐ Future salary
C ☐ Working conditions
D ☐ Job security
E ☐ Good supervisors
F ☐ Good fellow-workers
G ☐ Importance of work
H ☐ Opportunity for promotion
I ☐ Good fringe benefits
J ☐ Serving others
K ☐ Personal interest in work
Z

24. What occupation do you expect to make your career? Please be specific:

---- ______________________________

PART III. *GENERAL QUESTIONS*

PLEASE DO NOT WRITE IN THIS AREA.

25. What do you wish you had done differently in high school? Mark as many as apply.

☐①a. I wish I had studied more.
☐②b. I wish I had taken more college preparatory courses.
☐④c. I wish I had taken more vocational work.
1-(0) ☐ d. I wish I had had more social life.

26. Are you married?

11 ☐ Yes, I married while still in high school.
12 ☐ Yes, I married after leaving high school.
0- ☐ No
9-

If not, how soon do you expect to marry?

1 ☐ I plan to marry this year.
2 ☐ I plan to marry next year.
3 ☐ I plan to marry within 3 years.
4 ☐ I plan to marry sometime in the future.
5 ☐ I do not expect to marry.
9

27. Do you still keep in touch with your high school friends?

YES
3 ☐ I keep in touch with almost all.
2 ☐ I keep in touch with many of them.
1 ☐ I keep in touch with one or two.
NO
0 ☐ I don't keep in touch with any of them.
9

PLEASE DO NOT WRITE IN THIS AREA.

28. Where are you living at the present time?

1 ☐ At home with my parents or guardian.
2 ☐ Some other place.
9

29. About how much time have you been sick at home or in a hospital during the past year?

00 ☐ None
01 ☐ Less than a week
02 ☐ 1 to 2 weeks
03 ☐ 3 to 5 weeks
04 ☐ 6 to 12 weeks
05 ☐ 3 to 4 months
06 ☐ 5 to 7 months
07 ☐ 8 to 11 months
08 ☐ The whole year
10

30. Were you the driver in an automobile accident involving bodily injury or more than $100 property damage since June, 1960?

1 ☐ Yes
0 ☐ No
9

31. Of which of the following are you now a member?

11 ☐ Air Force Reserve
12 ☐ Army Reserve
13 ☐ Naval Reserve
14 ☐ Marine Corps Reserve
15 ☐ Coast Guard Reserve
21 ☐ Air National Guard
22 ☐ Army National Guard
31 ☐ Air ROTC
32 ☐ Army ROTC
33 ☐ Naval ROTC
00 ☐ None of the above
00

PLEASE DO NOT WRITE IN THIS AREA.

32. Are you now on active duty in the military service?

11 ☐ Yes, Air Force
12 ☐ Yes, Army
13 ☐ Yes, Navy
14 ☐ Yes, Marine Corps
15 ☐ Yes, Coast Guard
06 ☐ No, but I have been on active duty.
07 ☐ No, but I expect to be drafted.
08 ☐ No, but I expect to enlist voluntarily.
00 ☐ No, and I do not expect to be.
99

33. Have you a military service serial number?

0 ☐ No
1 ☐ Yes, the number is ______________
9

34. For how long have you VOLUNTEERED for ACTIVE DUTY in one of the armed services?

00 ☐ Not at all
01 ☐ 1 to 5 months
02 ☐ 6 months
03 ☐ 1 year
04 ☐ 2 years
05 ☐ 3 years
06 ☐ Minority enlistment
07 ☐ 4 years
08 ☐ 5 years
09 ☐ 6 years
(——) ☐ Other. Please specify: ______________
10

PLEASE DO NOT WRITE IN THIS AREA.

35. During the past year to what extent has a car been available to you?

5 ☐ I had my own car.
4 ☐ A car was available whenever I wanted it.
3 ☐ A car was available most of the time.
2 ☐ A car was available occasionally.
1 ☐ I had practically no use of a car.
0 ☐ I do not drive.
9

36. Would you like to serve in the Peace Corps?

4 ☐ Yes, for a 4 year period
3 ☐ Yes, for a 3 year period
2 ☐ Yes, for a 2 year period
1 ☐ Yes, for a 1 year period
0 ☐ No
9

37. How have your views and plans changed during the past year? Please write a paragraph on this.

____

____

____

____

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____

IF YOU HAVE NEVER ATTENDED COLLEGE DO NOT ANSWER THE REST OF THE QUESTIONS. PLEASE TURN IMMEDIATELY TO PAGE 7 WHERE THERE IS A SPACE FOR YOUR COMMENTS AND DIRECTIONS FOR RETURNING THIS BOOKLET.

PART IV. *COLLEGE*

PLEASE ANSWER THE QUESTIONS IN THIS SECTION IF YOU HAVE ATTENDED OR ARE ATTENDING A COLLEGE.

PLEASE DO NOT WRITE IN THIS AREA.

38. Fill in the name and location of the college or university you are attending or the last one you attended.

Name ______________________________

City ______________________________

State ______________________________

39. Approximately how far is the college from your home town?

______________ miles

40. As of June 1961 how many college credits will you have? (Indicate on ONE of the two lines below.)

2** ________ semester-hour credits

3** ________ quarter-hour credits

41. This question consists of the names of various subjects you may have studied in college. What were your grades in these subjects? Indicate as follows (showing your AVERAGE grade if you took more than one course in a subject):

Mark 4 for A
Mark 3 for B
Mark 2 for C
Mark 1 for D
Mark 0 for F
Mark 7 if you passed courses in this subject but specific grades are not reported in the college you attend
Mark 8 if you have taken no courses in this subject

PLEASE DO NOT WRITE IN THIS AREA.

____a. Mathematics *
____b. Physical sciences (including astronomy, physics, chemistry, geology, etc.) *
____c. Biological sciences (including botany, zoology, physiology, etc.) *
____d. Social studies (including history, government, political science, civics, economics, geography, sociology, etc.) *
____e. English composition and grammar *
____f. English literature *
____g. Foreign languages *
____h. Fine Arts *
____i. Music *
____j. Psychology *
____k. Philosophy *
____l. Religion *
____m. Education *
____n. Engineering *
____o. Business Administration *
____p. Home Economics *
____q. Agriculture and Forestry *
____r. Other courses. Please specify: *

____

____s. Average of marks in all courses *

9

42. Did you take any college-preparatory mathematics (i.e., algebra, geometry, trigonometry, etc.) in high school?

☐ No
☐ Yes

If "yes", how many semesters of it did you complete?

_______ semesters

43. Have you enrolled in any of the following kinds of mathematics courses in college: trigonometry, college algebra, analytic geometry, solid geometry, other college geometry, calculus, or a college mathematics course combining any of the above?

2 ☐ Yes.
1 ☐ No, but I plan to.
0 ☐ No, and I don't expect to take any college mathematics.
9

44. In which of the following areas do you expect to specialize or "major" in college? Mark ONE even if you haven't made up your mind definitely. Please MARK ONLY ONE.

A ☐ Mathematics
B ☐ Physical Sciences
C ☐ Biological Sciences
D ☐ Social Studies
F ☐ English and Literature
G ☐ Foreign Languages
H ☐ Fine Arts
I ☐ Music
J ☐ Psychology
K ☐ Philosophy
L ☐ Religion
M ☐ Education
N ☐ Engineering
O ☐ Business and Commerce
P ☐ Home Economics
Q ☐ Agriculture and Forestry
R ☐ Some other. Please specify:

____

Z

45. Which of the following degrees do you plan to earn? Mark as many as apply.

00 ☐ None
10 ☐ B.A. or B.S.
20 ☐ M.A. or M.S.
31 ☐ Ph.D.
32 ☐ Ed.D.
41 ☐ L.L.B.
42 ☐ M.D.
43 ☐ D.D.S.
99 ☐ Other. Specify: _______________
00

46. What is the main reason you went to college?

1 ☐ College graduates make more money.
2 ☐ The career I want to go into requires a college education.
3 ☐ To make good personal contacts for business or an occupation.
4 ☐ Because I enjoy learning.
5 ☐ Because most of my friends do.
6 ☐ For social reasons.
7 ☐ To get into intercollegiate athletics.
8 ☐ Because my parents wanted me to.
0 ☐ No special reason.
(__)9 ☐ Other. Please specify: _______________

____

9

47. Are you still in college?

A ☐ Yes.
- ☐ No. I dropped out.

If you dropped out of college, what was your main reason?

K ☐ I was offered a good job.
L ☐ I became homesick.
M ☐ I didn't enjoy the social life.
N ☐ I got married.
O ☐ College work was boring.
P ☐ I had to work too hard.
R ☐ I was afraid I was going to fail.
S ☐ I failed.
T ☐ Financial difficulties.
U ☐ I became ill.
V ☐ Family emergency.
Z ☐ Some other reason. Please specify:

____

I

48. Where did you live while attending college?

1 ☐ At home—within an hour's commuting time.
2 ☐ At home—more than an hour's commuting time.
3 ☐ In a college dormitory.
4 ☐ In a fraternity or sorority house.
5 ☐ Away from home in a rented room or apartment.
6 ☐ Away from home with friends or relatives.
8 ☐ Other. Please specify: _______________

____

9

NOTICE

Your answers to these questions will be kept in complete confidence. When the findings are published neither you nor your school will be identified in any way.

For Questions 49 and 50 indicate how much your first year of college cost. Please include the full cost even if you obtained some of your money from scholarships or other sources.

PLEASE DO NOT WRITE IN THIS AREA.

49. For TUITION, FEES, and BOOKS.

01 ☐ Less than $50
02 ☐ $50-$99
03 ☐ $100-$199
04 ☐ $200-$299
05 ☐ $300-$499
06 ☐ $500-$749
07 ☐ $750-$999
08 ☐ $1000-$1499
09 ☐ $1500 or more
10

50. For LIVING EXPENSES only.

01 ☐ Less than $300
02 ☐ $300-$499
03 ☐ $500-$749
04 ☐ $750-$999
05 ☐ $1000-$1499
06 ☐ $1500-$1999
07 ☐ $2000-$2499
08 ☐ $2500-$2999
09 ☐ $3000 or more
10

51. Of the total amount of money you spent to attend college during the period June 1960 through May 1961, about how much came from each of the following sources? Please write in the amount to the nearest $50 in front of each source below:

$________① a. Loans from the National Defense Education Act Loan Fund.
$________② b. Loans from college loan funds.
$________④ c. Loans from banks or other organizations.
$________① d. Loans from family or friends.
$________② e. Parents, family or sponsors.
$________④ f. A trust fund.
$________① g. My own savings.
$________② h. Working while attending college.
$________① i. Scholarships or grants from college attended.
$________② j. Scholarships or grants from other sources.

PLEASE DO NOT WRITE IN THIS AREA.

52. While you were attending college, did you also hold a job most of the time?

1 ☐ Yes
0 ☐ No
9

53. What are your major plans for the summer of 1961? (Please mark only ONE.)

1 ☐ Work full-time (at least 35 hours a week)
2 ☐ Work part-time (less than 35 hours a week)
3 ☐ Vacation at a summer camp or resort
4 ☐ Travel
5 ☐ Take summer courses
6 ☐ Stay at home
(__)8 ☐ Other. Please specify: ____________________

____
9

PLEASE DO NOT WRITE IN THIS AREA.

54. Indicate below how many hours a week, on the average, you spent in each of the following kinds of activities during your first year in college.

hrs.
** ____ per wk. a. Social activities, such as dating, going to parties, etc.
hrs.
** ____ per wk. b. Sports and athletics.
hrs.
** ____ per wk. c. Other extracurricular activities, such as clubs, student government, band, etc.
hrs.
** ____ per wk. d. Studying (outside of class).
hrs.
** ____ per wk. e. Earning money at a job.

55. Have you joined or pledged a social fraternity or sorority?

1 ☐ Yes, I am now an active member.
2 ☐ Yes, I am now a pledge.
3 ☐ Yes, I was pledged but have de-pledged.
4 ☐ Yes, I pledged, but was not elected to active membership.
5 ☐ No, I preferred not to join.
6 ☐ No, there are no fraternities or sororities on campus.
7 ☐ No, pledging occurs later at my college.
0

56. How well do you like college?

3 ☐ Very well
2 ☐ Fairly well
1 ☐ Not very well
0 ☐ Not at all
9

COMMENTS

Your comments and suggestions in connection with any part of this questionnaire are invited. If the space below is not sufficient an additional page may be enclosed with the booklet if desired.

____

____

____

____

Please sign your name on the line below:

____
(signature)

PLEASE CORRECT YOUR ADDRESS

Please correct your address, or name if you are now married, as it appears on the address label in the top section of page 8. This is to help us keep our address file up to date.

DIRECTIONS

When you have finished filling out the questions in the booklet, please fold the booklet so that the return address is on the outside and the panel containing your name is on the inside; then wet exposed tab and seal.

Form 1-A1

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PROJECT TALENT

UNIVERSITY OF PITTSBURGH
PITTSBURGH 13, PENNSYLVANIA

14 May 1962

For reference purposes
please refer to your
six-digit testing number.

Dear Project TALENT Participant:

First, we want to thank each of you for your help in the testing phase of Project TALENT in March 1960. We have heard from many of the students that the ten to twelve hours of testing was hard work but interesting. It was vital to the nation's welfare to gather these facts about you and your schools.

In December 1960 we sent lists of your scores on the Project TALENT tests to your school. The results are now being studied at our Computing Center, and the first in a series of reports on talents and their development has been released. But this describes only the beginning of this important research program. Your help is needed to get the facts for the next chapter in the story.

We need to know what has happened to you in the past two years and what your plans are now. The questions on our questionnaire have been prepared so that most of them can be answered by just checking the choice that describes what you've been doing. Please write in comments wherever you think some explanation is needed. Your answers will, of course, be kept in complete confidence. Neither you nor your school will be identified in any way when we publish our findings.

When you finish marking the choices for the questions, please sign your name on page three, fold the booklet so that our name and address are on the outside, and mail it back to us. The stamp has already been attached.

The members of the Project TALENT staff greatly appreciate your personal help in this program. We wish you success in carrying out your plans.

Sincerely,

John C. Flanagan

John C. Flanagan
Professor and Director of Project TALENT

PLEASE CORRECT YOUR ADDRESS

If your present address or name is different from that on the label on the top of page 4, please correct the label, so that we can keep our record up to date. Please do *not* remove the address label.

AFTER YOU ANSWER THE QUESTIONS, PLEASE REFOLD THE BOOKLET WITH THE RETURN ADDRESS ON THE OUTSIDE, SEAL WITH THE TAB, AND MAIL.

PLEASE DO NOT WRITE IN THIS AREA

— — Today's date ________________________
Month Day Year
— —
— — Date of Birth ________________________
Month Day Year

1. Check one:
1 ☐ Male
2 ☐ Female
9

2. Are you married?
1 ☐ Yes, I married while still in high school.
2 ☐ Yes, I married after leaving high school.
0 ☐ No.
9

3. Did you graduate from high school?
1 ☐ Yes.
2 ☐ No, but I am still in high school, and expect to graduate.
3 ☐ No, I am still in high school, but expect to leave without graduating.
4 ☐ No, I dropped out of high school without graduating.
9

4. If you dropped out of high school without graduating, what was the reason?
1 ☐ To get a job.
2 ☐ I became ill.
3 ☐ I was needed at home.
4 ☐ I got married.
5 ☐ I did not like school.
6 ☐ I had failing grades.
7 ☐ I was asked to leave.
8 ☐ I left for some other reason. (Please explain)
9
____

5. Have you a job (as of April 30, 1962)?
2 ☐ Yes, a full-time job (35 hrs./wk.)
1 ☐ Yes, a part-time job (less than 35 hrs./wk.)
0 ☐ No
9

6. What is (was) the job called?
———— ________________________

7. What do (did) you do on this job? Please be specific.
____
____

8. What is (was) your pay (before deductions) on this job? Please fill in ONE of the lines below.

5**** $__________per week
or
1**** $__________per month
00000

PLEASE DO NOT WRITE IN THIS AREA

9. As of April 30, 1962 were you looking for a job?
1 ☐ Yes.
2 ☐ No, I had a job.
3 ☐ No, I was going to school and didn't want a job.
4 ☐ No, I am a housewife, and was not looking for an outside job.
5 ☐ No, my health would not permit it.
8 ☐ No, I was not looking for a job for reasons other than those listed above.
9

*** **10. What is your Social Security number?**
**
**' ___ ___ ___ - ___ ___ - ___ ___ ___ ___
If none, check here ________

11. What occupation or profession do you plan to make your career? Be specific.
———— ________________________

PLEASE DO NOT WRITE IN THIS AREA

12. What kinds of school have you attended since leaving high school? (Mark as many as apply.)
Z ☐ None
A ☐ A college offering bachelor's degree or higher
B ☐ A junior or community college
C ☐ A technical institute
D ☐ A school of nursing (3 year program)
J ☐ A school of practical nursing
K ☐ A secretarial or business school
L ☐ A trade or apprentice school
M ☐ An armed forces enlisted man's school
R ☐ Other (please specify)
Z ________________________

13. Have you made any important decisions that you are sorry about now? (Mark as many as apply.)
☐ ① a. I am sorry I didn't go to college.
☐ ② b. I am sorry I started college.
☐ ④ c. I am sorry about the kind of work I decided to do.
— ☐ ⓪ d. None of the above.

14. Of which of the following are you now a member?
11 ☐ Air Force Reserve
12 ☐ Army Reserve
13 ☐ Naval Reserve
14 ☐ Marine Corps Reserve
15 ☐ Coast Guard Reserve
21 ☐ Air National Guard
22 ☐ Army National Guard
31 ☐ Air ROTC
32 ☐ Army ROTC
33 ☐ Naval ROTC
00 ☐ None of the above
00

15. Are you now on active duty in the military service?
11 ☐ Yes, Air Force
12 ☐ Yes, Army
13 ☐ Yes, Navy
14 ☐ Yes, Marine Corps
15 ☐ Yes, Coast Guard
06 ☐ No, but I have been on active duty.
07 ☐ No, but I expect to be drafted.
08 ☐ No, but I expect to enlist voluntarily.
00 ☐ No, and I do not expect to be.
99

PLEASE DO NOT WRITE IN THIS AREA

16. Have you a military serial number? (Do not give your selective service number.)
0 ☐ No
1 ☐ Yes, the number is________________
9

17. Would you like to serve in the Peace Corps?
8 ☐ Yes, for a 4-year period
7 ☐ Yes, for a 3-year period
6 ☐ Yes, for a 2-year period
5 ☐ Yes, for a 1-year period
1 ☐ No, although I am familiar with it
0 ☐ No, I am not familiar with it
9

18. Have you attended college since leaving high school?
1 ☐ Yes, I am a full-time student.
2 ☐ Yes, I am a part-time student.
3 ☐ Yes, I entered but have dropped out temporarily.
4 ☐ Yes, I entered but dropped out and do not plan to return.
5 ☐ No, but I plan to enter college within a year or two.
6 ☐ No, but I plan to enter college eventually; I have no idea when.
7 ☐ No, and I have no plans to do so.
9

19. How have your views and plans changed during the past year? Please write a paragraph on this.

Start here. ________________________

IF YOU HAVE NOT GONE TO COLLEGE PLEASE GO ON TO THE COMMENTS SECTION AT END OF NEXT PAGE.

PLEASE DO NOT WRITE IN THIS AREA

PLEASE ANSWER THE QUESTIONS IN THIS SECTION IF YOU HAVE ATTENDED OR ARE ATTENDING A COLLEGE OR UNIVERSITY.

20. Fill in the name and location of the college or university you are attending, or the last one you attended:

College ________________

City ________________

State ________________

21. When did you enter college for the first time?

________ Month ________ Year

22. If you have attended more than one college or university since leaving high school, please indicate below:

Name of college	City and State	Dates

23. Are you still in college?

A ☐ Yes.
- ☐ No. I dropped out.

If you dropped out of college, what was your main reason?

K ☐ I was offered a good job.
L ☐ I became homesick.
M ☐ I didn't enjoy the social life.
N ☐ I got married.
O ☐ College work was boring.
P ☐ I had to study too hard.
R ☐ I was afraid I was going to fail.
S ☐ I failed.
T ☐ Financial difficulties.
U ☐ I became ill.
V ☐ Family emergency.
Y ☐ Some other reason. Please specify:
Z
I ________________

24. As of June 1962 how many college credits will you have? (Indicate on ONE of the two lines below.)

2** ______semester-hour or trimester-hour credits.

or

3** ______quarter-hour credits.

If your college does not use these units,
000 ______check at left.
999

25. In which of the following areas do you expect to specialize or "major" in college? Mark ONE even if you haven't made up your mind definitely. Please MARK ONLY ONE.

PLEASE DO NOT WRITE IN THIS AREA

A ☐ Mathematics
B ☐ Physical sciences
C ☐ Biological sciences
D ☐ Social studies
F ☐ English and literature
G ☐ Foreign languages
H ☐ Fine arts
I ☐ Music
J ☐ Psychology
K ☐ Philosophy
L ☐ Religion
M ☐ Education
N ☐ Engineering
O ☐ Business and commerce
P ☐ Home economics
Q ☐ Agriculture and forestry
R ☐ Nursing
Y ☐ Some other. Please specify:
Z ________________

A-11

PLEASE DO NOT WRITE IN THIS AREA

26. This question consists of the names of various subjects you may have studied in college. What were your grades in these subjects? Indicate as follows (showing your AVERAGE grade if you took more than one course in a subject):

Mark 4 for A
Mark 3 for B
Mark 2 for C
Mark 1 for D
Mark 0 for F
Mark 7 if you passed courses in this subject but specific grades are not reported in the college you attend.
Mark 8 if you have taken no courses in this subject.

______a. Mathematics
______b. Physical sciences (including astronomy, physics, chemistry, geology, etc.)
______c. Biological sciences (including botany, zoology, physiology, etc.)
______d. Social studies (including history, government, political science, civics, economics, geography, sociology, etc.)
______e. English composition and grammar
______f. English literature
______g. Foreign languages
______h. Fine arts
______i. Music
______j. Psychology
______k. Philosophy
______l. Religion
______m. Education
______n. Engineering
______o. Business administration
______p. Home economics
______q. Agriculture and forestry
______r. Nursing
______y. Other courses. Please specify:
____
______z. Average of marks in all courses

9

PLEASE DO NOT WRITE IN THIS AREA

27. Which of the following college degrees or diplomas do you plan to earn? (Mark as many as apply.)

00 ☐ None
01 ☐ Associate in Arts (2 years)
10 ☐ B.A. or B.S.
20 ☐ M.A. or M.S.
31 ☐ Ph.D.
32 ☐ Ed.D. (education)
41 ☐ LL.B. (law)
42 ☐ M.D. (medicine)
43 ☐ D.D.S. (dentistry)
99 ☐ Other. Specify:________________
00

COMMENTS SECTION

Your comments and suggestions about this questionnaire are welcomed. If you need more space you may enclose another page with the booklet when you send it back to us.

____

____

____

____

Please sign your name on the line below:

____
(signature)

When you finish, please refold the booklet, with the return address on the outside. Then seal the booklet with the tab, and mail it. Thank you.

Form 1-B3a

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PROJECT TALENT

UNIVERSITY OF PITTSBURGH
PITTSBURGH 13, PENNSYLVANIA

December 2, 1963

Dear Project TALENT Alumnus:

Do you remember Project TALENT? We haven't forgotten you! First, we want to thank you again for your help in the testing phase of Project TALENT in March 1960. We have heard from many of the students that the ten to twelve hours of testing was hard work but interesting. It was vital to the nation's welfare to gather these facts about you and your schools. Now we want to know how you're doing.

In December 1960 we sent lists of your scores on the Project TALENT tests to your school. The results are still being studied at our Computing Center, and the first three reports on talents and their development have been released. But these describe only part of this important research program. Your help is needed to get the facts for the next chapter in the story.

We need to know what has happened to you in the past two years and what your plans are now. You can answer most of the questions by checking the choice that describes what you've been doing. Please write in comments wherever you think some explanation is needed. Your answers will, of course, be kept in complete confidence. Neither you nor your school will be identified in any way when we publish our findings.

When you finish marking the choices for the questions, please sign your name on page three, fold the booklet so that the Project TALENT address is on the outside, and mail it back to us. No postage is necessary. Just put it in the mailbox.

The members of the Project TALENT staff greatly appreciate your personal help. We wish you success in carrying out your plans.

Sincerely,

John C. Flanagan

John C. Flanagan
Professor and Director of Project TALENT

PLEASE CORRECT YOUR ADDRESS

If your present address or name is different from that on the label on the top of page 4, please correct the label, so that we can keep our record up to date. Please do *not* remove the address label.

Form 1-Cla

-- Today's Date: ____________ Month ____________ Day ____________ Year
--

-- **1.** Date of your birth: ____________ Month ____________ Day ____________ Year

---- **2.** Date you last attended high school: ____________ Month ____________ Year

3. Check one:
1 ☐ Male
2 ☐ Female
0

4. Are you married?
1 ☐ Yes, I married while I was in high school.
2 ☐ Yes, I married after I left high school.
3 ☐ No.
0

5. Were you still in high school as of Dec. 1, 1963?
5 ☐ No, I had dropped out of high school.
4 ☐ No, I had graduated from high school.
3 ☐ Yes, in grade 10.
2 ☐ Yes, in grade 11.
1 ☐ Yes, in grade 12.
0

PLEASE DO NOT WRITE IN THIS AREA

* **6.** What was the last grade you completed in high school? ______

7. Did you get a high-school diploma?
1 ☐ Yes, at the time I finished grade 12.
2 ☐ Yes, by examination after I left high school.
3 ☐ No, I entered college at the end of grade 11.
4 ☐ No, I dropped out of high school.
5 ☐ No, I went through grade 12 but did not get a diploma.
6 ☐ No, I am still in high school.
0

8. If you dropped out of school without graduating why was this? (Mark as many as apply.)
☐ ① a. I needed to work and earn some money.
☐ ② b. I didn't like school.
— ☐ ④ c. I wasn't learning anything useful to me.
☐ ① d. I was failing in my studies.
☐ ② e. I got into trouble with the people at school.
— ☐ ④ f. I got married.
☐ ① g. I got sick.
☐ ② h. I was needed at home.
— ☐ ④ i. I felt that I was too old to stay in school.
☐ ① j. Friends of my age were already out of school.
☐ ② k. I was asked to leave the school.
— ☐ ④ l. I left for some other reason. (Explain briefly.)

0 ______________________________

9. In high school, what course of study did you take?
1 ☐ General.
2 ☐ College preparatory.
3 ☐ Commercial or business.
4 ☐ Vocational.
5 ☐ Agriculture.
6 ☐ Other (Please specify.): ______________
0

PLEASE DO NOT WRITE IN THIS AREA

10. How long did it take you to find the *first* full-time job you had *after* you left high school?
1 ☐ I found it before I left high school.
2 ☐ Less than 1 week.
3 ☐ 1-2 weeks.
4 ☐ 3-4 weeks.
5 ☐ 2 months.
6 ☐ 3-4 months.
7 ☐ 5-6 months.
8 ☐ 7-12 months.
9 ☐ Over a year.
0

11. Did you have a job as of December 1, 1963?
100 ☐ No. (If this is your answer, skip question 12 and go to 13.)
2-- ☐ Yes.
Average number of hours worked per week: ______ hours.
0

12. If you had a job as of December 1, 1963,

---- (a) What was this called? ______________

(b) What did you do on it? ______________

(c) What was your pay (before deductions) *when you first started* on it? (Please fill in ONE of the lines.)
5**** $______________ per week.
1**** *or* $______________ per month.
00000

(d) What was your pay (before deductions) on that job *as of Dec. 1, 1963?* (Please fill in ONE of the lines.)
5**** $______________ per week.
1**** *or* $______________ per month.
00000

(e) How long have you worked on that job?
1 ☐ Less than 1 month.
2 ☐ 1-6 months.
3 ☐ 7-12 months.
4 ☐ 1-2 years.
5 ☐ More than 2 years.
0

PLEASE DO NOT WRITE IN THIS AREA

(f) For whom did you work on that job?
1 ☐ For myself.
2 ☐ For a business I own in part.
3 ☐ For the U. S. Government.
4 ☐ For a state government.
5 ☐ For a local government.
6 ☐ For a school or college.
7 ☐ For some other business or organization.
0

13. As of December 1, 1963, were you looking for a job?
1 ☐ Yes, a full-time job.
2 ☐ Yes, a part-time job.
3 ☐ No, I had a job.
4 ☐ No, I was in school and didn't want a job.
5 ☐ No, I am a housewife.
6 ☐ No, my health would not permit it.
7 ☐ No, for a reason not given above.
0

*** **14.** Write your social security number here:
**
**** ___ ___ ___ - ___ ___ - ___ ___ ___ ___

If you have no such number, please check here ☐.

15. What occupation or profession do you plan for a career?

---- (Be specific.) ______________

16. What kinds of school have you attended since leaving high school? (Mark as many as apply.)
10 ☐ None.
01 ☐ A college offering the bachelor's degree or higher.
02 ☐ A junior or community college.
03 ☐ A technical institute.
04 ☐ A school of nursing (3-year program).
05 ☐ A school of practical nursing.
06 ☐ A secretarial or business school.
07 ☐ A trade or apprentice school.
08 ☐ An armed forces enlisted-man's school.
09 ☐ Other (Please specify.):

____

00

PLEASE DO NOT WRITE IN THIS AREA

17. Have you made any important decisions that you are sorry about now? (Mark as many as apply.)
☐ ① a. I am sorry I didn't go to college.
☐ ② b. I am sorry I started college.
☐ ④ c. I am sorry about the kind of work I decided to do.
— ☐ ⓪ d. None of the above.

18. On December 1, 1963 were you on active military duty?
11 ☐ Yes, in the Air Force.
12 ☐ Yes, in the Army.
13 ☐ Yes, in the Navy.
14 ☐ Yes, in the Marine Corps.
15 ☐ Yes, in the Coast Guard.
21 ☐ No, but I was once on active duty.
22 ☐ No, but I expect to be drafted.
23 ☐ No, but I expect to enlist voluntarily.
24 ☐ No, and I do not expect to be.
00

19. Have you a military serial number? (Do not give your selective service number.)
1 ☐ No.
2 ☐ Yes, the number is ______________
0

PLEASE DO NOT WRITE IN THIS AREA

20. Would you like to serve in the Peace Corps?
6 ☐ Yes, for a 4-year period.
5 ☐ Yes, for a 3-year period.
4 ☐ Yes, for a 2-year period.
3 ☐ Yes, for a 1-year period.
2 ☐ No, although I am familiar with it.
1 ☐ No, I am not familiar with it.
0

21. Have you attended college since leaving high school?
1 ☐ Yes, I was a full-time student on Dec. 1, 1963.
2 ☐ Yes, I was a part-time student on Dec. 1, 1963.
3 ☐ Yes, I entered but am now out temporarily.
4 ☐ Yes, but I dropped out and don't plan to return.
5 ☐ No, but I plan to enter college within a year or two.
6 ☐ No but I plan to enter college later; I have no idea when.
7 ☐ No, and I have no plans to do so.
0

ANSWER THE QUESTIONS IN THIS SECTION IF YOU HAVE ATTENDED OR ARE NOW ATTENDING A COLLEGE OR UNIVERSITY. IF NOT, GO TO THE COMMENTS SECTION AT THE END.

22. Fill in the name and location of the college or university you are now attending, or the last one you attended:

-- College: ______________________________

--- City: ______________________ State: __________

23. When did you enter college for the first time?

- ______________________________
Month Year

24. If you have attended more than one college or university since leaving high school, please indicate below:

Name of college	City and State	Dates

PLEASE DO NOT WRITE IN THIS AREA

25. Are you still in college?
10 ☐ Yes.
- ☐ No. I dropped out.

If you dropped out of college, what was your main reason?
21 ☐ I was offered a good job.
22 ☐ I became homesick.
23 ☐ I didn't enjoy the social life.
24 ☐ I got married.
25 ☐ College work was boring
26 ☐ I had to study too hard.
27 ☐ I was afraid I was going to fail.
31 ☐ I flunked out.
32 ☐ I got into disciplinary troubles.
33 ☐ Financial difficulties.
34 ☐ I became ill.
35 ☐ Family emergency.
40 ☐ Some other reason. (Please specify.):
50
____
00

26. As of June 1964 how many college credits do you expect to have? (Indicate on ONE of the lines below.)
2** ______semester-hour credits.
2** ______trimester-hour credits.
3** ______quarter-hour credits.

100 ______If your college does not use these units, check at left.
000

27. Which of the following college degrees or diplomas do you plan to earn? (Mark as many as apply.)
00 ☐ None.
01 ☐ Associate in Arts (2 years).
10 ☐ B.A. or B.S.
20 ☐ M.A. or M.S.
31 ☐ Ph.D.
32 ☐ Ed.D. (education).
41 ☐ LL.B. (law).
42 ☐ M.D. (medicine).
43 ☐ D.D.S. (dentistry).
50 ☐ Other (Specify.): ______________________________
00

28. In which of the following areas do you expect to specialize or "major" in college? Mark ONE even if you haven't made up your mind. Please MARK ONLY ONE.
A ☐ Mathematics.
B ☐ Physical sciences (astronomy, physics, chemistry, etc.).
C ☐ Biological sciences (botany, zoology, physiology, etc.).
D ☐ Social studies (history, government, political science, civics, economics, geography, sociology, etc.).
F ☐ English.
G ☐ Foreign languages.
H ☐ Fine arts.
I ☐ Music.
J ☐ Psychology.
K ☐ Philosophy.
L ☐ Religion.
M ☐ Education.
N ☐ Engineering.
O ☐ Business and commerce.
P ☐ Home economics.
Q ☐ Agriculture and forestry.
R ☐ Nursing.
S ☐ Physical education.
T ☐ Some other. (Please specify.): ______________________________
____
Z

PLEASE DO NOT WRITE IN THIS AREA

29. Various subjects you may have studied in college are listed below. What were your grades in these subjects? Write your grade for each subject on the line provided (showing your AVERAGE grade if you took more than one course in a subject):
Write 5 for a grade of A.
Write 4 for a grade of B.
Write 3 for a grade of C.
Write 2 for a grade of D.
Write 1 for a grade of F.
Write 7 if you passed but received no grade.
Write 8 if you have taken no courses in this subject.

* ______a. Mathematics.
* ______b. Physical sciences (astronomy, physics, chemistry, etc.).
* ______c. Biological sciences (botany, zoology, physiology, etc.).
* ______d. Social studies (history, government, political science, civics, economics, geography, sociology, etc.).
* ______e. English composition and grammar.
* ______f. English literature.
* ______g. Foreign languages.
* ______h. Fine arts.
* ______i. Music.
* ______j. Psychology.
* ______k. Philosophy.
* ______l. Religion.
* ______m. Education.
* ______n. Engineering.
* ______o. Business administration.
* ______p. Home economics.
* ______q. Agriculture and forestry.
* ______r. Nursing.
* ______s. Other courses. (Please specify.): ______________
* ______t. Average of marks in all courses.
0

COMMENTS

We'd be glad to have you make comments and suggestions about this questionnaire. If the space below is not big enough, enclose a separate page when you fold and seal your booklet.

____

____

____

Please sign your name below.

____
(Signature)

PLEASE CORRECT YOUR NAME AND ADDRESS.

Please correct your name and address on the label on page 4. This helps us to keep your address file with us up to date.

After you have filled out the questionnaire, please fold the booklet so that our return address is on the outside and your corrected address label is on the inside. Then moisten the tab, seal the booklet, and drop it in a mailbox.

IT REQUIRES NO POSTAGE.

Form 1-C1

PROJECT TALENT

UNIVERSITY OF PITTSBURGH
PITTSBURGH, PENNSYLVANIA 15213

August 3, 1964

Dear Project TALENT Alumnus:

Do you remember Project TALENT? We haven't forgotten you! First, we want to thank you again for your help in the testing phase of Project TALENT in March 1960. We have heard from many of the students that the ten to twelve hours of testing was hard work but interesting. It was vital to the nation's welfare to gather these facts about you and your schools. Now we want to know how you're doing.

In December 1960 we sent lists of your scores on the Project TALENT tests to your school. The results are still being studied at our Computing Center, and the first six reports on talents and their development have been released. But these describe only part of this important research program. Your help is needed to get the facts for the next chapter in the story.

We need to know what has happened to you in the past four years and what your plans are now. You can answer most of the questions by checking the choice that describes what you've been doing. Please write in comments wherever you think some explanation is needed. Your answers will, of course, be kept in complete confidence. Neither you nor your school will be identified in any way when we publish our findings.

When you finish marking the choices for the questions, please sign your name on page three, fold the booklet so that the Project TALENT address is on the outside, and mail it back to us. No postage is necessary. Just put it in the mailbox.

The members of the Project TALENT staff greatly appreciate your personal help. We wish you success in carrying out your plans.

Sincerely,

John C. Flanagan

John C. Flanagan
Professor and Director of Project TALENT

PLEASE CORRECT YOUR ADDRESS

If your present address or name is different from that on the label on the top of page 4, please correct the label, so that we can keep our record up to date. Please do *not* remove the address label.

1. Date of your birth: ______________________
Month Day Year

2. Date you last attended high school: ____________
Month Year

3. Check one:
☐ Male
☐ Female

4. Are you married?
☐ Yes, I married while I was in high school.
☐ Yes, I married after I left high school.
☐ No, but I was married for a while.
☐ No, I was never married.

5. Will you be attending high school in the fall of 1964?
☐ No, I dropped out of high school.
☐ No, I have entered college or graduated from high school.
☐ Yes, in grade 10.
☐ Yes, in grade 11.
☐ Yes, in grade 12.

6. Circle the last grade you completed in high school.
8 9 10 11 12

7. Did you get a high school diploma?
☐ Yes, at the time I finished grade 12.
☐ Yes, by examination after I left high school.
☐ Yes, but I entered college at the end of grade 11.
☐ No, I entered college at the end of grade 11.
☐ No, I dropped out of high school.
☐ No, I went through grade 12 but did not get a diploma.
☐ No, I am still in high school.

8. If you dropped out of school without graduating why was this? (Mark as many as apply.)
☐ ① a. I needed to work and earn some money.
☐ ② b. I didn't like school.
☐ ④ c. I wasn't learning anything useful to me.
☐ ① d. I was failing in my studies.
☐ ② e. I got into trouble with the people at school.
☐ ④ f. I got married.
☐ ① g. I got sick.
☐ ② h. I was needed at home.
☐ ④ i. I felt that I was too old to stay in school.
☐ ① j. Friends of my age were already out of school.
☐ ② k. I was asked to leave the school.
☐ ④ l. I left for some other reason. (Explain briefly.)

____

9. In high school, what course of study did you take?
☐ General.
☐ College preparatory.
☐ Commercial or business.
☐ Vocational.
☐ Agriculture.
☐ Other (Please specify.): ____________________

10. How long did it take you to find the *first* full-time job you had *after* you left high school? (Include summer full-time jobs.)
☐ I am still in high school.
☐ I found it before I left high school.
☐ Less than 1 week.
☐ 1–2 weeks.
☐ 3–4 weeks.
☐ 2 months.
☐ 3–6 months.
☐ 7–12 months.
☐ Over a year.

11. Did you have any paid job as of August 1, 1964?
☐ No. (If this is your answer, skip question 12 and go to 13.)
☐ Yes.
Average number of hours worked per week: ______hours.

12. If you had a paid job as of August 1, 1964,

(a) What was the title of this job? ____________________

(b) What did you do on it? ____________________

(c) What was your pay (before deductions) *when you first started* on it? (Please fill in ONE of the lines.)

$ ________________ per week.
or $ ________________ per month.
or $ ________________ per hour.

(d) What was your pay (before deductions on that job as of August 1, 1964? (Please fill in ONE of the lines.)

$ ________________ per week.
or $ ________________ per month.
or $ ________________ per hour.

(e) How long have you worked on that job?
☐ Less than 1 month.
☐ 1–6 months.
☐ 7–12 months.
☐ 1–2 years.
☐ More than 2 years.

(f) For whom did you work on that job?
☐ For myself.
☐ For a business I own in part.
☐ For the U.S. Government.
☐ For a state government.
☐ For a local government.
☐ For a school or college.
☐ For some other business, organization, or individual.

13. As of August 1, 1964, were you looking for a job?
☐ Yes, a full-time job.
☐ Yes, a part-time job.
☐ No, I had a job.
☐ No, I was in school and didn't want a job.
☐ No, I am a housewife.
☐ No, my health would not permit it.
☐ No, for a reason not given above.

14. Write your social security number here:

_ _ _ - _ _ - _ _ _ _

☐ If you have no such number, please check box at left.

15. What occupation or profession do you plan for a career?
(Be specific.) ____________________

16. What kinds of school (either day or night) have you attended since leaving high school? (Mark as many as apply.)
☐ None.
☐ A college offering the bachelor's degree or higher.
☐ A junior or community college.
☐ A technical institute.
☐ A school of nursing (3-year program).
☐ A school of practical nursing.
☐ A secretarial or business school.
☐ A trade or apprentice school or vocational school.
☐ An armed forces enlisted-man's school.
☐ Other (Please specify.): ____________________

17. Have you made any important decisions that you are sorry about now? (Mark as many as apply.)
☐ a. I am sorry I didn't graduate from high school.
☐ b. I am sorry I didn't go to college.
☐ c. I am sorry I started college.
☐ d. I am sorry about the kind of work I decided to do.
☐ e. None of the above

18. Of which of the following were you a member on August 1, 1964?
☐ Air Force Reserve
☐ Army Reserve
☐ Naval Reserve
☐ Marine Corps Reserve
☐ Coast Guard Reserve
☐ Air National Guard
☐ Army National Guard
☐ Air ROTC
☐ Army ROTC
☐ Naval ROTC
☐ None of the above

19. On August 1, 1964, were you on active military duty?
☐ Yes, Air Force
☐ Yes, Army
☐ Yes, Navy
☐ Yes, Marine Corps
☐ Yes, Coast Guard
☐ No, but I have been on active duty.
☐ No, but I expect to be drafted.
☐ No, but I expect to enlist voluntarily.
☐ No, and I do not expect to be.

20. Have you a military serial number? (Do not give your selective service number.)
☐ No.
☐ Yes, the number is ____________________

21. Would you like to serve in the Peace Corps?

☐ Yes, for a 4-year period.
☐ Yes, for a 3-year period.
☐ Yes, for a 2-year period.
☐ Yes, for a 1-year period.
☐ No, although I am familiar with it.
☐ I am not familiar with it.

22. Have you attended college since leaving high school?

☐ Yes, I was a full-time student in the school year ending in June 1964.
☐ Yes, I was a part-time student in the school year ending in June 1964.
☐ Yes, I entered but I dropped out temporarily.
☐ Yes, but I dropped out and don't plan to return.
☐ No, but I plan to enter college within a year or two.
☐ No, but I plan to enter college later; I have no idea when.
☐ No, and I have no plans to do so.

ANSWER THE QUESTIONS IN THIS SECTION IF YOU HAVE ATTENDED OR ARE NOW ATTENDING A COLLEGE OR UNIVERSITY. IF NOT, GO TO THE COMMENTS SECTION AT THE END.

23. Fill in the name and location of the college or university you are now attending, or the last one you attended:

College: ______________________________

University (if college is part of one): ______________________________

City: ______________________ State ____________

24. When did you enter college for the first time?

____
Month Year

25. If you have attended more than one college or university since leaving high school, please indicate below:

Name of college	City and State	Dates

26. Were you attending college at the end of the school year in June 1964?

☐ Yes.
☐ No. I dropped out before that.

If you dropped out of college, what was your main reason?

☐ I was offered a job.
☐ I became homesick.
☐ I didn't enjoy the social life.
☐ I got married.
☐ College work was boring.
☐ I had to study too hard.
☐ I was afraid I was going to fail.
☐ I flunked out.
☐ I got into disciplinary troubles.
☐ I had financial difficulties.
☐ I became ill.
☐ There was a family emergency.
☐ Some other reason. (Please specify.):

____

27. How many college credits did you have by July 1964? (Indicate on ONE of the lines below.)

_______ semester-hour credits.
_______ trimester-hour credits.
_______ quarter-hour credits.
_______ If your college does not use these units, check at left.

28. Which of the following college degrees or diplomas do you plan to earn? (Mark as many as apply.)

☐ None
☐ Associate in Arts
☐ B.A. or B.S. (e.g., B.S. in Ed., B.S. in Engin., etc.)
☐ B.B.A.
☐ Other bachelor's degree (Specify):
☐ M.A. or M.S.
☐ Other master's degree (Specify):
☐ Ph.D.
☐ Ed.D.
☐ LL.B. (law)
☐ M.D. (medicine)
☐ D.D.S. (dentistry)
☐ Other professional degree (Specify):
☐ Other (Specify): ______________________________

29. In which of the following areas do you expect to specialize or "major" in college? Mark ONE even if you haven't made up your mind. Please MARK ONLY ONE.

☐ Mathematics.
☐ Physical sciences (astronomy, physics, chemistry, etc.).
☐ Biological sciences (botany, zoology, physiology, etc.).
☐ Social studies (history, government, political science, civics, economics, geography, sociology, etc.).
☐ English.
☐ Foreign languages.
☐ Fine arts.
☐ Music.
☐ Psychology.
☐ Philosophy.
☐ Religion.
☐ Education.
☐ Engineering.
☐ Business and commerce.
☐ Home economics.
☐ Agriculture and forestry.
☐ Nursing.
☐ Physical Education.
☐ Some other. (Please specify.) ______________________________

30. Various subjects you may have studied in college are listed below. What were your grades in these subjects? Write your grade for each subject on the line provided (showing your AVERAGE grade if you took more than one course in a subject):

Write 4 for a grade of A.
Write 3 for a grade of B.
Write 2 for a grade of C.
Write 1 for a grade of D.
Write 0 for a grade of F.
Write P if you passed but received no grade.
Write X if you have taken no courses in this subject.

_______ a. Mathematics.
_______ b. Physical sciences (astronomy, physics, chemistry, etc.).
_______ c. Biological sciences (botany, zoology, physiology, etc.).
_______ d. Social studies (history, government, political science, civics, economics, geography, sociology, etc.).
_______ e. English composition and grammar.
_______ f. English literature.
_______ g. Foreign languages.
_______ h. Fine arts.
_______ i. Music.
_______ j. Psychology.
_______ k. Philosophy.
_______ l. Religion.
_______ m. Education.
_______ n. Engineering.
_______ o. Business, commerce, or secretarial work.
_______ p. Home economics.
_______ q. Agriculture and forestry.
_______ r. Nursing.
_______ s. Other courses. (Please specify.): ______________
_______ t. Average of marks in all courses.

COMMENTS

We'd be glad to have you make comments and suggestions about this questionnaire. If the space below is not big enough, enclose a separate page when you fold and seal your booklet.

____
____
____

Please sign your name below and fill in the date.

____
(Signature)

____
Month Day Year

PLEASE CORRECT YOUR NAME AND ADDRESS.

Please correct your name and address on the label on page 4. This helps us to keep your address file with us up to date.

After you have filled out the questionnaire, please fold the booklet so that our return address is on the outside and your corrected address label is on the inside. Then moisten the tab, seal the booklet, and drop it in a mailbox.

IT REQUIRES NO POSTAGE.

Form 1-D1

Project TALENT

Interview Schedule for Non-respondents
(Grade 12)

Current name and address of subject:

Name ______________________ Testing No. ____________

Address ______________________ School Code ____________

City and State ______________________

1. Did you graduate from high school?

☐ Yes Date ____________

☐ No

2. Have you gone to any school since you left high school?

☐ Yes Name ______________________ Studying what? ____________

Kind of school ______________________

☐ No

3. When did you enter this school?

Date ______________________

4. Are you still attending?

☐ Yes

☐ No Reason ______________________

5. Are you married?

☐ Yes

☐ No

6. Are you or have you been in the military service?

☐ Yes Specify type ______________________ How long? ____________

☐ No

7. Have you had a full-time job?

☐ Yes What was (or is) it called? ______________________

☐ No

8. What occupation do you expect to make your career?

____

9. Did you ever receive a questionnaire through the mail from Project TALENT?

☐ Yes

☐ No ☐ Received any other materials?

☐ Not sure ______________________

(If yes to question 9, and you are contacting this student at a different address from the one supplied on your list, ask:)

9a. How did you get it?

☐ Forwarded by parents

☐ Forwarded by post office

☐ Other. Specify: ______________________

10. (For interviewer only.) Try to find out what S has been doing since June 1961, if this is not clear from the above answers.

Interviewer's comments:

Interviewee: Interviewer: ______________________

☐ Non-respondent

☐ Other. Specify: ______________________

March 1964

SPECIAL QUESTIONNAIRE FOR ELEVENTH-GRADE STUDENTS TESTED BY PROJECT TALENT

1. Individual Identification

Name when tested ________________________ Project TALENT testing number: ________
Last First Middle

Name at present: ________________________

Present address: ________________________
Street Address

____
City State

-- Date of birth: ________________________
-- Month Day Year
--

- 2. Check whether you are:

1 ☐ Male
2 ☐ Female
9

- 3. Did you graduate from high school?

1,2 ☐ Yes. Date: ________________________
Month Year

5 ☐ No, I am still in high school in grade ______.

4,7 ☐ No, I dropped out in ________________________
9 Month Year

PLEASE DO NOT WRITE IN THIS AREA

- 4. If you dropped out, why did you do so?

1 ☐ I wanted to get a job.
2 ☐ I became ill.
3 ☐ I was needed at home.
4 ☐ I got married.
5 ☐ I did not like school.
6 ☐ I had failing grades.
7 ☐ I was asked to leave.
8 ☐ For some other reason: (specify) ________________________
9

- 5. Are you now married?

☐ Yes. Date of marriage: ________________________
Month Year

☐ No.

6. Were you ever married in the past even if you are not now married?

(0) ☐ Yes. Date of that marriage: ________________________
(1) Month Year
(2) ☐ No.
9

7. Did you have a job two years ago in April or May 1962?

☐ Yes.
☐ No.

If you answer "Yes," write in answers to the following:

8. How many hours per week did you work on it? ____________________

9. What was the job called? ____________________

10. What did you do on that job? ____________________

11. What occupation or profession do you now plan to made your career?

(Be specific.) ____________________

12. Have your plans for a career changed in the last two years?

☐ Yes. They definitely changed in ____________________
Month Year

☐ No.

If you answered "Yes," what occupation or profession did you first plan to make your career? ____________________

13. Have you attended any school since leaving high school?

☐ Yes.
☐ No.

If you answered "Yes," fill in one or more of the following:

Type	Date Began Attending
☐ A college offering the bachelor's degree or higher	____________ Month Year
☐ A junior or community college offering not more than 2 years of work	____________ Month Year
☐ A technical institute (not part of a college or university)	____________ Month Year
☐ A school of nursing (3-year program)	____________ Month Year
☐ A school of practical nursing	____________ Month Year
☐ A secretarial or business school	____________ Month Year
☐ A trade or apprentice school	____________ Month Year
☐ An Armed-Forces enlisted-man's school	____________ Month Year
☐ Other ____________	____________ Month Year

PLEASE DO NOT WRITE IN THIS AREA

14. If you attended any college, junior college, or community college since leaving high school, give the name and location, the dates of attendance, and check whether attendance was full time or part time.

Date

_______________ College ☐ Full time ☐ Part time From: ______ To: ______

_______________ City State

_______________ College ☐ Full time ☐ Part time From: ______ To: ______

_______________ City State

_______________ College ☐ Full time ☐ Part time From: ______ To: ______

_______________ City State

15. What was the area in which you expected or still expect to specialize or "major" in college? (Give one even if you haven't made up your mind definitely. Mark only one.)

A ☐ Mathematics
B ☐ Physical sciences
C ☐ Biological sciences
D ☐ Social studies
F ☐ English and literature
G ☐ Foreign languages
H ☐ Fine arts
I ☐ Music
J ☐ Psychology
K ☐ Philosophy
L ☐ Religion
M ☐ Education
N ☐ Engineering
O ☐ Business and commerce
P ☐ Home economics
Q ☐ Agriculture and forestry
R ☐ Nursing
Y ☐ Some other. Please specify: ______________________
Z

—

(A) 16. If you dropped out of college, what was your main reason?

K ☐ I was offered a good job.
L ☐ I became homesick.
M ☐ I didn't enjoy the social life.
N ☐ I got married.
O ☐ I found college work boring.
P ☐ I had to study too hard.
R ☐ I was afraid I was going to fail.
S ☐ I failed.
T ☐ I had financial difficulties.
U ☐ I became ill.
V ☐ There was an emergency in my family.
Y ☐ Some other reason. Please specify: ______________________
Z

— 17. Are you now in active military service?

☐ Yes.

	Date Service Began	
	Month	**Year**
11 ☐ Air Force	________	________
12 ☐ Army	________	________
13 ☐ Navy	________	________
14 ☐ Marine Corps	________	________
15 ☐ Coast Guard	________	________

☐ No.

	Month	**Year**
06 ☐ I finished active duty on	________	________
07 ☐ I expect to be drafted in	________	________
08 ☐ I expect to enlist voluntarily in	________	________

00 ☐ I have never been and don't expect to be in active military service.
99

---

18. Name (or names) of person (or persons) from whom data about the individual were obtained:

Name	**Relationship to Individual**
______________________	______________________
______________________	______________________
______________________	______________________

19. Name of person who filled out the questionnaire:

____
Signature

____
Date completed

____
Title

Form 1-B4a

SPECIAL QUESTIONNAIRE FOR TENTH-GRADE STUDENTS
TESTED BY PROJECT TALENT

University of Pittsburgh, Pittsburgh, Pa. 15213

Individual Identification

Name of School: ____________

City: ____________ State: ________ Code: ________

Name when tested: ____________
Last First Middle

Project TALENT testing number: ____________

Name at present: ____________
Last First Middle

Present address: ____________
Street Address

____
City State

1. Date of your birth: ____________
Month Day Year

2. Date you last attended high school: ____________
Month Year

3. Check one:
☐ Male
☐ Female

4. Are you married?
☐ Yes, I married while I was in high school.
☐ Yes, I married after I left high school.
☐ No.

5. Were you still in high school as of Dec. 1, 1963?
☐ No, I had dropped out of high school.
☐ No, I had graduated from high school.
☐ Yes, in grade 10.
☐ Yes, in grade 11.
☐ Yes, in grade 12.

6. What was the last grade you completed in high school? ____

7. Did you get a high-school diploma?
☐ Yes, at the time I finished grade 12.
☐ Yes, by examination after I left high school.
☐ No, I entered college at the end of grade 11.
☐ No, I dropped out of high school.
☐ No, I went through grade 12 but did not get a diploma.
☐ No, I am still in high school.

8. If you dropped out of high school without graduating, why was this? (Mark as many as apply.)
☐ ① a. I needed to work and earn some money.
☐ ② b. I didn't like school.
☐ ④ c. I wasn't learning anything useful to me.
☐ ① d. I was failing in my studies.
☐ ② e. I got into trouble with the people at school.
☐ ④ f. I got married.
☐ ① g. I got sick.
☐ ② h. I was needed at home.
☐ ④ i. I felt that I was too old to stay in school.
☐ ① j. Friends of my age were already out of school.
☐ ② k. I was asked to leave the school.
☐ ④ l. I left for some other reason. (Explain briefly.)

____

9. Did you have a job as of December 1, 1963?
☐ No. (If this is your answer, skip question 10 and go to 11.)
☐ Yes.
Average number of hours worked per week: ____ hours.

10. If you had a job as of December 1, 1963,

(a) What was this called? ____________

(b) What did you do on it? ____________

(c) What was your pay (before deductions) *when you started* on it? (Please fill in ONE of the lines.)
$____________ per week.
or $____________ per month.

11. As of December 1, 1963, were you looking for a job?
☐ Yes, a full-time job.
☐ Yes, a part-time job.
☐ No, I had a job.
☐ No, I was in school and didn't want a job.
☐ No, I am a housewife.
☐ No, my health would not permit it.
☐ No, for a reason not given above.

12. What occupation or profession do you plan for a caree

(Be specific.) ____________

13. On December 1, 1963 were you on active military duty
☐ Yes, in the Air Force.
☐ Yes, in the Army.
☐ Yes, in the Navy.
☐ Yes, in the Marine Corps.
☐ Yes, in the Coast Guard.
☐ No, but I was once on active duty.
☐ No, but I expect to be drafted.
☐ No, but I expect to enlist voluntarily.
☐ No, and I do not expect to be.

14. What kinds of school have you attended since leav high school? (Mark as many as apply.)
☐ None.
☐ A college offering the bachelor's degree or higher.
☐ A junior or community college.
☐ A technical institute.
☐ A school of nursing (3-year program).
☐ A school of practical nursing.
☐ A secretarial or business school.
☐ A trade or apprentice school.
☐ An armed forces enlisted-man's school.
☐ Other (Please specify.):

____

Turn over to the other sid

15. Have you attended college since leaving high school?
1 ☐ Yes, I was a full-time student on Dec. 1, 1963.
2 ☐ Yes, I was a part-time student on Dec. 1, 1963.
3 ☐ Yes, I entered but am now out temporarily.
4 ☐ Yes, but I dropped out and don't plan to return.
5 ☐ No, but I plan to enter college within a year or two.
6 ☐ No but I plan to enter college later; I have no idea when.
7 ☐ No, and I have no plans to do so.
0

ANSWER THE QUESTIONS IN THIS SECTION IF YOU HAVE ATTENDED OR ARE NOW ATTENDING A COLLEGE OR UNIVERSITY.

16. Fill in the name and location of the college or university you are now attending, or the last one you attended:

College: ____________________

City: ____________________ State: ____________

17. When did you enter college for the first time?

____
Month Year

18. If you have attended more than one college or university since leaving high school, please indicate below:

Name of college	City and State	Dates

19. In which of the following areas do you expect to specialize or "major" in college? Mark ONE even if you haven't made up your mind. Please MARK ONLY ONE.
A ☐ Mathematics.
B ☐ Physical sciences (astronomy, physics, chemistry, etc.).
C ☐ Biological sciences (botany, zoology, physiology, etc.).
D ☐ Social studies (history, government, political science, civics, economics, geography, sociology, etc.).
F ☐ English.
G ☐ Foreign languages.
H ☐ Fine arts.
I ☐ Music.
J ☐ Psychology.
K ☐ Philosophy.
L ☐ Religion.
M ☐ Education.
N ☐ Engineering.
O ☐ Business and commerce.
P ☐ Home economics.
Q ☐ Agriculture and forestry.
R ☐ Nursing.
S ☐ Physical education.
T ☐ Some other. (Please specify.): ____________________
Z ____________________

20. Are you still in college?
10 ☐ Yes.
☐ No. I dropped out.

If you dropped out of college, what was your main reason?
21 ☐ I was offered a good job.
22 ☐ I became homesick.
23 ☐ I didn't enjoy the social life.
24 ☐ I got married.
25 ☐ College work was boring.
26 ☐ I had to study too hard.
27 ☐ I was afraid I was going to fail.
31 ☐ I flunked out.
32 ☐ I got into disciplinary troubles.
33 ☐ Financial difficulties.
34 ☐ I became ill.
35 ☐ Family emergency.
40 ☐ Some other reason. (Please specify.):
____

21. Name (or names) of person (or persons) from whom data about the individual were obtained:

Name	Relationship to Individual

22. Name of person who filled out the questionnaire:

____
Signature

____
Date Completed

____
Title

SPECIAL QUESTIONNAIRE FOR
NINTH-GRADE STUDENTS TESTED BY PROJECT TALENT

University of Pittsburgh, Pittsburgh, Pennsylvania 15213

Name of School at Time of Testing (1960): Name: ____________________

City: __________ State: _____ School Code: ____

Name when tested: ____________________ Project TALENT testing number: ________

Last First Middle

Name at present: ____________________

Last First Middle

Present Address: ____________________

Street Address

____

City State

Name and address of someone who is most likely to know your address at any time:

Name: ____________________

Street Address: ____________________

City: __________ State: _____

Name (or names) of person (or persons) from whom data about the individual were obtained:

Name	Relationship to Individual

Name of person who filled out this questionnaire:

____
Signature

____
Date Completed

____
Title

3 - 65 Form 1-D2a

1. Date of your birth: ____________________
Month Day Year

2. Date you last attended high school: ____________
Month Year

3. Check one:
☐ Male
☐ Female

4. Are you married?
☐ Yes, I married while I was in high school.
☐ Yes, I married after I left high school.
☐ No, but I was married for a while.
☐ No, I was never married.

5. Were you attending high school in the fall of 1964?
☐ No, I had dropped out of high school.
☐ No, I had entered college or graduated from high school.
☐ Yes, in grade 10.
☐ Yes, in grade 11.
☐ Yes, in grade 12.

6. Circle the last grade you completed in high school.
8 9 10 11 12

7. Did you get a high school diploma?
☐ Yes, at the time I finished grade 12.
☐ Yes, by examination after I left high school.
☐ Yes, but I entered college at the end of grade 11.
☐ No, I entered college at the end of grade 11.
☐ No, I dropped out of high school.
☐ No, I went through grade 12 but did not get a diploma.
☐ No, I am still in high school.

8. If you dropped out of school without graduating why was this? (Mark as many as apply.)
☐ ① a. I needed to work and earn some money.
☐ ② b. I didn't like school.
☐ ④ c. I wasn't learning anything useful to me.
☐ ① d. I was failing in my studies.
☐ ② e. I got into trouble with the people at school.
☐ ④ f. I got married.
☐ ① g. I got sick.
☐ ② h. I was needed at home.
☐ ④ i. I felt that I was too old to stay in school.
☐ ① j. Friends of my age were already out of school.
☐ ② k. I was asked to leave the school.
☐ ④ l. I left for some other reason. (Explain briefly.)
____

9. In high school, what course of study did you take?
☐ General.
☐ College preparatory.
☐ Commercial or business.
☐ Vocational.
☐ Agriculture.
☐ Other (Please specify.): ____________

10. How long did it take you to find the *first* full-time job you had *after* you left high school? (Include summer full-time jobs.)
☐ I am still in high school.
☐ I found it before I left high school.
☐ Less than 1 week.
☐ 1–2 weeks.
☐ 3–4 weeks.
☐ 2 months.
☐ 3–6 months.
☐ 7–12 months.
☐ Over a year.

11. Did you have any paid job as of August 1, 1964?
☐ No. (If this is your answer, skip question 12 and go to 13.)
☐ Yes.
Average number of hours worked per week: ______ hours.

12. If you had a paid job as of August 1, 1964,

(a) What was the title of this job? ____________

(b) What did you do on it? ____________

(c) What was your pay (before deductions) *when you first started* on it? (Please fill in ONE of the lines.)
$ ____________ per week.
or $ ____________ per month.
or $ ____________ per hour.

(d) What was your pay (before deductions on that job as of August 1, 1964? (Please fill in ONE of the lines.)
$ ____________ per week.
or $ ____________ per month.
or $ ____________ per hour.

(e) How long have you worked on that job?
☐ Less than 1 month.
☐ 1–6 months.
☐ 7–12 months.
☐ 1–2 years.
☐ More than 2 years.

(f) For whom did you work on that job?
☐ For myself.
☐ For a business I own in part.
☐ For the U.S. Government.
☐ For a state government.
☐ For a local government.
☐ For a school or college.
☐ For some other business, organization, or individual.

PLEASE DO NOT WRITE IN THIS AREA

13. As of August 1, 1964, were you looking for a job?
☐ Yes, a full-time job.
☐ Yes, a part-time job.
☐ No, I had a job.
☐ No, I was in school and didn't want a job.
☐ No, I am a housewife.
☐ No, my health would not permit it.
☐ No, for a reason not given above.

14. Write your social security number here:
___ ___ ___ - ___ ___ - ___ ___ ___ ___
☐ If you have no such number, please check box at left.

15. What occupation or profession do you plan for a career?
(Be specific.) ____________

16. What kinds of school (either day or night) have you attended since leaving high school? (Mark as many as apply.)
☐ None.
☐ A college offering the bachelor's degree or higher.
☐ A junior or community college.
☐ A technical institute.
☐ A school of nursing (3-year program).
☐ A school of practical nursing.
☐ A secretarial or business school.
☐ A trade or apprentice school or vocational school.
☐ An armed forces enlisted-man's school.
☐ Other (Please specify.): ____________

17. Have you made any important decisions that you are sorry about now? (Mark as many as apply.)
☐ a. I am sorry I didn't graduate from high school.
☐ b. I am sorry I didn't go to college.
☐ c. I am sorry I started college.
☐ d. I am sorry about the kind of work I decided to do.
☐ e. None of the above

18. Of which of the following were you a member on August 1, 1964?
☐ Air Force Reserve
☐ Army Reserve
☐ Naval Reserve
☐ Marine Corps Reserve
☐ Coast Guard Reserve
☐ Air National Guard
☐ Army National Guard
☐ Air ROTC
☐ Army ROTC
☐ Naval ROTC
☐ None of the above

19. On August 1, 1964, were you on active military duty?
☐ Yes, Air Force
☐ Yes, Army
☐ Yes, Navy
☐ Yes, Marine Corps
☐ Yes, Coast Guard
☐ No, but I have been on active duty.
☐ No, but I expect to be drafted.
☐ No, but I expect to enlist voluntarily.
☐ No, and I do not expect to be.

20. Have you a military serial number? (Do not give your selective service number.)
☐ No.
☐ Yes, the number is ____________

PLEASE DO NOT WRITE IN THIS AREA

21. Would you like to serve in the Peace Corps?
04 ☐ Yes, for a 4-year period.
03 ☐ Yes, for a 3-year period.
02 ☐ Yes, for a 2-year period.
01 ☐ Yes, for a 1-year period.
00 ☐ No, although I am familiar with it.
10 ☐ I am not familiar with it.
XX

22. Have you attended college since leaving high school?
14 ☐ Yes, I was a full-time student in the school year ending in June 1964.
13 ☐ Yes, I was a part-time student in the school year ending in June 1964.
12 ☐ Yes, I entered but I dropped out temporarily.
11 ☐ Yes, but I dropped out and don't plan to return.
09 ☐ No, but I plan to enter college within a year or two.
08 ☐ No, but I plan to enter college later; I have no idea when.
07 ☐ No, and I have no plans to do so.
XX

ANSWER THE QUESTIONS IN THIS SECTION IF YOU HAVE ATTENDED OR ARE NOW ATTENDING A COLLEGE OR UNIVERSITY. IF NOT, GO TO THE COMMENTS SECTION AT THE END.

23. Fill in the name and location of the college or university you are now attending, or the last one you attended:

College: ______________________________

University (if college is part of one): ______________________________

City: ______________________ State ____________

24. When did you enter college for the first time?

____
Month Year

25. If you have attended more than one college or university since leaving high school, please indicate below:

Name of college	City and State	Dates

PLEASE DO NOT WRITE IN THIS AREA

26. Were you attending college at the end of the school year in June 1964?
10 ☐ Yes.
— ☐ No. I dropped out before that.

If you dropped out of college, what was your main reason?
21 ☐ I was offered a job.
22 ☐ I became homesick.
23 ☐ I didn't enjoy the social life.
24 ☐ I got married.
25 ☐ College work was boring.
26 ☐ I had to study too hard.
27 ☐ I was afraid I was going to fail.
31 ☐ I flunked out.
32 ☐ I got into disciplinary troubles.
33 ☐ I had financial difficulties.
34 ☐ I became ill.
35 ☐ There was a family emergency.
40 ☐ Some other reason. (Please specify.):
30
XX
____

27. How many college credits did you have by July 1964? (Indicate on ONE of the lines below.)

2** ________ semester-hour credits.
2** ________ trimester-hour credits.
3** ________ quarter-hour credits.
100 ________ If your college does not use these units, check at left.
XXX

28. Which of the following college degrees or diplomas do you plan to earn? (Mark as many as apply.)
00 ☐ None
01 ☐ Associate in Arts
11 ☐ B.A. or B.S. (e.g., B.S. in Ed., B.S. in Engin., etc.)
12 ☐ B.B.A.
1 ☐ Other bachelor's degree (Specify):
21 ☐ M.A. or M.S.
2 ☐ Other master's degree (Specify):
31 ☐ Ph.D.
32 ☐ Ed.D.
41 ☐ LL.B. (law)
42 ☐ M.D. (medicine)
43 ☐ D.D.S. (dentistry)
4 ☐ Other professional degree (Specify):
☐ Other (Specify): ______________________
XX

29. In which of the following areas do you expect to specialize or "major" in college? Mark ONE even if you haven't made up your mind. Please MARK ONLY ONE.
01 ☐ Mathematics.
02 ☐ Physical sciences (astronomy, physics, chemistry, etc.)
03 ☐ Biological sciences (botany, zoology, physiology, etc.)
04 ☐ Social studies (history, government, political science, civics, economics, geography, sociology, etc.).
05 ☐ English.
06 ☐ Foreign languages.
07 ☐ Fine arts.
08 ☐ Music.
09 ☐ Psychology.
10 ☐ Philosophy.
11 ☐ Religion.
12 ☐ Education.
13 ☐ Engineering.
14 ☐ Business and commerce.
15 ☐ Home economics.
16 ☐ Agriculture and forestry.
17 ☐ Nursing.
18 ☐ Physical Education.
20 ☐ Some other. (Please specify.) ______________________
XX ______________________________

PLEASE DO NOT WRITE IN THIS AREA

30. Various subjects you may have studied in college are listed below. What were your grades in these subjects? Write your grade for each subject on the line provided (showing your AVERAGE grade if you took more than one course in a subject):
Write 4 for a grade of A.
Write 3 for a grade of B.
Write 2 for a grade of C.
Write 1 for a grade of D.
Write 0 for a grade of F.
Write P if you passed but received no grade.
Write X if you have taken no courses in this subject.

______ a. Mathematics.
______ b. Physical sciences (astronomy, physics, chemistry, etc.).
______ c. Biological sciences (botany, zoology, physiology, etc.).
______ d. Social studies (history, government, political science, civics, economics, geography, sociology, etc.).
______ e. English composition and grammar.
______ f. English literature.
______ g. Foreign languages.
______ h. Fine arts.
______ i. Music.
______ j. Psychology.
______ k. Philosophy.
______ l. Religion.
______ m. Education.
______ n. Engineering.
______ o. Business, commerce, or secretarial work.
______ p. Home economics.
______ q. Agriculture and forestry.
______ r. Nursing.
______ s. Other courses. (Please specify.): ______________
______ t. Average of marks in all courses.
X

COMMENTS

We'd be glad to have you make comments and suggestions about this questionnaire. If the space below is not big enough, use back of this page.

____
____
____
____

31. Have you received any questionnaires from Project TALENT in the mail during the past year?

1 ☐ No
2 ☐ Yes
X

Appendix B

Responses to the Mailed Questionnaires

	Page
Grade 12	B-2
Grade 11	B-7
Grade 10	B-9
Grade 9	B-12

Responses to the Twelfth-Grade Mailed Questionnaires

(Percentages Based on Weighted Frequencies)

Males	Females	
		1. Did you graduate from high school?
99.0	99.3	Yes.
1.0	0.7	No.
100.0	100.0	
		2. Have you attended college?
51.5	40.5	Yes, full-time.
3.2	2.8	Yes, part-time.
5.1	2.5	Yes, but dropped temporarily.
1.4	2.6	Yes, but dropped for good.
8.2	4.4	No, but plan to in 1-2 years.
11.0	6.1	No, but plan to later.
19.6	41.1	No, don't plan to.
100.0	100.0	
		3. Since leaving high school, have you attended a school other than college?
9.8	13.4	Yes, full-time.
4.8	4.7	Yes, part-time.
68.7	69.5	No, don't plan to.
16.7	12.4	No, but plan to later.
100.0	100.0	
		4. I plan to get
13.8	34.6	no further schooling.
63.5	38.5	a college degree.
4.5	3.7	a junior-college diploma.
0.1	4.9	a registered nurse certificate.
0.0	1.7	a practical nurse certificate.
3.5	11.3	a business school diploma.
14.6	5.3	an apprentice certificate.
100.0	100.0	
		5. Since leaving high school, I have attended
46.1	34.4	a 4-year college or university.
8.8	6.7	a 2-year college.
3.4	1.1	a technical institute.
0.0	3.6	a school of nursing (3 years).
0.0	0.7	a school of practical nursing.
2.0	7.8	a business school.
2.7	2.2	a trade school.
7.8	0.2	an armed-forces enlisted school.
2.8	3.6	some other school.
26.4	39.7	No school or no response.
100.0	100.0	
		6. Did you want to go to college?
17.8	27.1	No, I wanted to earn money.
2.2	14.5	No, I wanted to get married.
11.2	0.4	No, I wanted military service.
10.8	15.6	No, I wanted other school.
7.8	6.5	No, for some other reason.
22.9	17.8	Yes, but couldn't afford it.
1.3	1.4	Yes, but family emergency prevented.
1.7	3.5	Yes, but I was married.
4.7	3.3	Yes, but I hadn't taken right courses.
6.5	2.8	Yes, but my grades were too low.
1.8	0.9	Yes, but I wasn't accepted.
11.3	6.2	Yes, but some other reason prevented.
100.0	100.0	
		7. Number of full-time jobs since leaving high school.
20.6	28.8	None.
47.2	49.7	One.
24.1	17.8	Two.
8.1	3.7	Three or more.
100.0	100.0	
		8. Time to find first full-time job:
47.9	39.3	Found it before leaving high school.
12.4	12.4	Less than a week.
10.7	10.3	1-2 weeks.
9.1	9.7	2-4 weeks.
6.9	8.9	1-2 months.
5.0	7.6	2-4 months.
2.0	3.9	4-6 months.
6.0	7.9	More than 6 months.
100.0	100.0	
		9. When first full-time job started:
16.0	9.0	Before May 1960.
46.3	38.5	May-June 1960.
16.2	21.6	July-August 1960.
5.4	9.3	September-October 1960.
1.7	3.7	November-December 1960.
2.6	4.1	January-February 1961.
2.4	3.6	March-April 1961.
9.4	10.2	May-June 1961.
100.0	100.0	
		10. Found first full-time job through:
41.6	25.8	Friend or relative.
3.2	8.6	High school.
0.7	2.0	Some other school.
0.5	0.1	Union or bargaining group.
2.0	4.5	U.S. Employment Service.
0.9	2.9	Other public employment agency.
1.2	4.0	Private employment agency.
2.2	5.3	An advertisement.
47.7	46.8	Direct application to employer.
100.0	100.0	

Responses to the Twelfth-Grade Mailed Questionnaires (cont.)

11. Starting Pay (rate per year):

0.3	0.6	0- 500
4.3	4.2	501-1000
4.7	9.6	1001-1500
9.1	15.9	1501-2000
23.7	33.6	2001-2500
20.4	21.7	2501-3000
15.6	9.8	3001-3500
8.8	3.2	3501-4000
5.6	0.9	4001-4500
2.9	0.2	4501-5000
2.2	0.1	5001-5500
0.9	0.1	5501-6000
0.6	0.1	6001-6500
0.4	0.0	6501-7000
0.1	0.0	7001-7500
0.2	0.0	7501-8000
0.1	0.0	8001-8500
0.1	0.0	8501 or more
100.0	100.0	

12. Did you have a full-time job in May 1961?

37.4	37.3	Yes, full-time.
16.4	12.3	Yes, part-time.
8.6	7.9	No, but wanted full-time job.
3.0	2.9	No, but wanted part-time job.
29.6	29.6	No, was in school.
0.0	5.5	No, am housewife.
5.0	4.5	No, didn't want job for some other reason.
100.0	100.0	

13. Pay at time of completing questionnaire (rate per year).

0.4	0.4	$ 0- 500
4.4	2.4	$ 501-1000
12.2	4.5	$1001-1500
5.6	9.2	$1501-2000
14.5	26.5	$2001-2500
16.4	27.3	$2501-3000
16.8	18.8	$3001-3500
11.2	7.4	$3501-4000
7.8	2.4	$4001-4500
4.4	0.4	$4501-5000
2.8	0.2	$5001-5500
1.5	0.1	$5501-6000
0.7	0.1	$6001-6500
0.6	0.1	$6501-7000
0.2	0.0	$7001-7500
0.3	0.1	$7501-8000
0.0	0.0	$8001-8500
0.2	0.1	$8501 or more
100.0	100.0	

14. How did you like this job?

41.7	62.4	Very well.
41.8	29.7	Fairly well.
11.4	5.7	Not very well.
5.1	2.2	Not at all.
100.0	100.0	

15. Plans about type of work done on job.

15.0	8.3	Plans to make career of it.
21.5	42.5	No present plans to change.
21.7	20.9	Plan to stay in it a few years.
41.8	28.3	Plan to change soon.
100.0	100.0	

16. How long were you looking for a full-time job between June 1, 1960-June 1, 1961?

43.4	39.0	Not at all.
5.3	5.3	Less than a week.
7.2	7.5	1-2 weeks.
8.4	8.5	2-4 weeks.
9.2	10.3	1-2 months.
9.4	10.6	2-4 months.
5.5	6.2	4-6 months.
11.6	12.6	More than 6 months.
100.0	100.0	

17. Most important aspect of job or career is:

2.1	2.7	Starting salary.
9.6	4.2	Future salary.
3.2	7.3	Working conditions.
16.8	12.1	Job security.
0.4	0.9	Good supervisors.
1.3	3.5	Good fellow-workers.
3.3	3.5	Importance of work.
14.7	7.6	Opportunity for promotion.
0.2	0.3	Good fringe benefits.
3.8	10.8	Serving others.
44.6	47.1	Personal interest in work.
100.0	100.0	

18. Second most important aspect of job or career is:

4.4	6.1	Starting salary.
21.1	12.9	Future salary.
8.4	13.2	Working conditions.
17.4	12.0	Job security.
1.2	2.4	Good supervisors.
4.0	9.1	Good fellow-workers.
7.4	7.8	Importance of work.
16.5	10.4	Opportunity for promotion.
0.9	0.9	Good fringe benefits.
4.6	10.2	Serving others.
14.1	15.0	Personal interest in work.
100.0	100.0	

Responses to the Twelfth-Grade Mailed Questionnaires (cont.)

		19. In high school, I wish I
68.8	63.2	Had studied more.
31.2	36.8	Had not.
24.6	22.1	Had taken more college prep courses.
75.4	77.9	Had not.
12.2	17.2	Had taken more vocational courses.
87.8	82.8	Had not.
18.3	17.2	Had had more social life.
81.7	82.8	Had not.
100.0	100.0	

		20. Are you married?
11.5	13.4	Yes, married in high school.
88.5	86.6	Yes, married after high school.
100.0	100.0	
2.0	5.8	No, I plan to marry this year.
3.7	7.6	No, I plan to marry next year.
12.9	17.6	No, I plan to marry in 3 years.
74.1	64.7	No, I plan to marry sometime.
7.3	4.3	No, I don't expect to marry.
100.0	100.0	

		21. Still in touch with high-school friends?
3.6	2.1	None.
29.0	32.7	One or two.
58.3	55.7	Many.
9.1	9.5	Almost all.
100.0	100.0	

		22. Time sick at home or in hospital in last year:
64.9	46.9	None.
24.6	31.6	Less than 1 week.
7.0	14.7	1-2 weeks.
2.3	4.7	3-5 weeks.
0.7	1.1	6-12 weeks.
0.3	0.5	3-4 months.
0.1	0.3	5-7 months.
0.0	0.1	8-11 months.
0.1	0.1	The whole year.
100.0	100.0	

		23. Were you the driver in auto accident (bodily injury or over $100 property damage) after June 1960?
90.6	97.0	No.
9.4	3.0	Yes.
100.0	100.0	

		24. Are you now on active duty in the military service?
3.9	0.1	Yes, the Air Force.
3.0	0.1	Yes, the Army.
4.2	0.1	Yes, the Navy.
1.1	0.0	Yes, the Marine Corps.
0.3	0.0	Yes, the Coast Guard.
3.1	0.1	No, but I have been.
21.0	0.0	No, but I expect to be drafted.
26.5	1.0	No, but I expect to enlist.
36.9	98.6	No, I don't expect to be.
100.0	100.0	

		25. For how long have you volunteered for active duty in one of the armed services?
82.4	99.6	Not at all.
0.3	0.0	1-5 months.
2.9	0.0	6 months.
0.4	0.0	1 year.
1.8	0.1	2 years.
3.4	0.2	3 years.
7.5	0.1	4 years.
0.1	0.0	5 years.
0.3	0.0	6 years.
0.0	0.0	Other.
0.9	0.0	Minority enlistment.
100.0	100.0	

		26. Availability of car during the past year:
40.2	12.8	Had my own.
12.7	18.2	Whenever I wanted it.
16.8	18.9	Most of the time.
12.5	14.9	Available occasionally.
11.3	11.6	Had no use for one.
6.5	23.6	I don't drive.
100.0	100.0	

		27. Like to serve in Peace Corps?
5.0	2.2	Yes, for 4 years.
1.9	0.9	Yes, for 3 years.
10.6	6.9	Yes, for 2 years.
13.1	13.9	Yes, for 1 year.
68.4	75.1	No.
100.0	100.0	

		28. Have attended a recognized college:
17.4	16.5	2-year college.
80.0	81.0	4-year college.
2.6	2.5	Unidentified College.
100.0	100.0	
58.7	43.7	Attending any recognized college.
41.3	56.3	Not attending recognized college.
100.0	100.0	

Responses to the Twelfth-Grade Mailed Questionnaires (cont.)

29. How many miles from home is the college you attend or last attended?

63.5	63.6	0- 99
15.3	14.4	100- 199
6.6	7.2	200- 299
4.1	4.6	300- 399
1.9	2.3	400- 499
1.6	1.3	500- 599
1.0	1.2	600- 699
0.8	0.8	700- 799
0.6	0.7	800- 899
0.4	0.5	900- 999
0.7	0.8	1000-1099
2.4	1.8	1100-1999
1.1	0.8	2000 or over
100.0	100.0	

30. Median College grades in: (A=5; B=4; C=3; D=2; F=1)

3.2	3.4	Mathematics.
3.2	3.3	Physical Sciences.
3.2	3.3	Biological Sciences.
3.3	3.4	Social Sciences.
3.1	3.6	English Composition.
3.2	3.6	English Literature.
3.4	3.8	Foreign Languages.
3.6	3.8	Fine Arts.
4.0	4.1	Music.
3.3	3.4	Psychology.
3.4	3.6	Philosophy.
3.6	3.8	Religion.
3.5	3.8	Education.
3.6	3.2	Engineering.
3.4	3.8	Business Admin.
3.0	3.9	Home Economics.
3.7	3.8	Agriculture and Forestry.
3.8	3.9	Other courses.
3.2	3.4	Average in all courses.

31. Did you take college-prep math in high school?

88.8	87.1	Yes.
11.2	12.9	No.
100.0	100.0	

2.0	1.7	0 Semesters.
3.1	2.5	1 Semester.
10.7	14.4	2 Semesters.
4.0	3.5	3 Semesters.
16.0	30.6	4 Semesters.
3.3	3.5	5 Semesters.
20.6	25.9	6 Semesters.
4.7	3.0	7 Semesters.
31.6	13.7	8 Semesters.
4.0	1.2	9 Semesters.
100.0	100.0	

32. In college have you enrolled in trig., algebra, geometry, calculus, or any combination of these?

65.3	32.4	Yes.
15.0	18.5	No, but I plan to.
19.7	49.1	No, I don't expect to.
100.0	100.0	

33. In which field do you expect to major in college?

6.2	3.8	Math.
7.4	2.0	Physical science.
7.6	6.2	Biological science.
8.0	6.6	Social studies.
3.1	8.8	English and Literature.
1.1	4.3	Foreign languages.
1.9	3.9	Fine arts.
1.4	2.6	Music.
2.7	3.9	Psychology.
0.9	0.3	Philosophy.
1.1	0.9	Religion.
5.4	24.6	Education.
17.7	0.2	Engineering.
18.4	10.5	Business and Commerce.
0.1	4.7	Home Economics.
3.6	0.1	Agriculture and forestry.
13.4	16.6	Some other field.
100.0	100.0	

34. Degree you plan to earn:

9.6	15.2	None.
46.3	52.6	B.A. or B.S.
19.2	18.2	M.A. or M.S.
9.4	3.0	Ph.D.
0.9	1.8	Ed.D.
2.7	0.3	LL.B.
5.1	1.2	M.D.
1.7	0.1	D.D.S.
5.1	7.6	Other.
100.0	100.0	

35. The main reason you went to college:

17.9	5.6	College grads make more money.
64.5	64.6	Career I want requires college education.
2.4	2.3	Make good personal contacts.
7.4	18.0	I enjoy learning.
0.3	0.4	Most of my friends went.
0.3	1.2	Social reasons.
0.9	0.0	For intercollegiate athletics.
3.1	4.5	My parents wanted me to.
3.2	3.4	No special reasons.
100.0	100.0	

Responses to the Twelfth-Grade Mailed Questionnaires (cont.)

		36. Are you still in college?
85.8	83.4	Yes.
14.2	16.6	No, I dropped out.
100.0	100.0	
		I dropped out because:
5.9	7.1	I was offered a good job.
0.7	1.0	I became homesick.
0.7	0.6	I didn't enjoy social life.
2.3	13.0	I got married.
5.6	2.6	College work was boring.
1.3	1.3	I had to work too hard.
6.6	2.9	I was afraid of failing.
23.7	9.4	I failed.
21.6	15.3	I had financial difficulties.
3.0	6.2	I became ill.
2.0	2.3	of family emergency.
26.6	38.3	of some other reason.
100.0	100.0	

		37. Where did you live while attending college?
37.3	31.8	At home, travel time 1 hr. or less.
2.2	2.1	At home, travel time over 1 hr.
45.2	57.0	In college dormitory.
4.1	1.2	In fraternity or sorority house.
8.3	3.1	In rented room or apt.
1.4	1.8	With friends or relatives.
1.5	3.0	Some other place.
100.0	100.0	

		38. Cost of tuition, fees, books for first year of college.
3.2	3.3	Less than $50
7.3	7.0	$ 50-$ 99
11.9	11.2	$ 100-$ 199
13.9	13.6	$ 200-$ 299
18.7	18.6	$ 300-$ 499
12.7	13.1	$ 500-$ 749
11.9	12.4	$ 750-$ 999
13.7	14.2	$1000-$1499
6.7	6.6	$1500 or more
100.0	100.0	

		39. Living expenses for first year in college.
32.8	31.6	Less than $300
16.4	17.1	$ 300-$ 499
21.2	23.2	$ 500-$ 749
16.4	16.3	$ 750-$ 999
10.0	8.9	$1000-$1499
2.2	2.0	$1500-$1999
0.6	0.6	$2000-$2499
0.2	0.1	$2500-$2999
0.2	0.2	$3000 or more
100.0	100.0	

		40. Percentage of students obtaining funds for college expenses in 1960-1961 from:
3.6	5.2	NDEA loan fund.
1.6	1.2	College loan fund.
2.6	2.5	Loans from banks, etc.
5.9	3.6	Loans from family, friends.
66.0	75.4	Parents, family, sponsors.
2.2	2.5	A trust fund.
51.1	36.1	Own savings.
20.3	16.8	Money saved during period.
12.1	14.7	Scholarships or grants from college.
10.6	14.7	Other scholarships or grants.

		41. While attending college did you work most of the time?
29.2	23.0	Yes.
70.8	77.0	No.
100.0	100.0	

		42. Major plans for summer of 1961:
70.5	50.9	Work full time.
8.0	13.6	Work part time.
0.5	0.8	Vacation at camp or resort.
1.6	2.6	Travel.
9.8	15.6	Take summer courses.
3.2	10.0	Stay at home.
6.4	6.5	Some other plans.
100.0	100.0	

		43. Have you joined or pledged a frat. or sorority?
13.5	13.0	Yes, now active member.
6.5	3.6	Yes, now a pledge.
3.6	1.6	Yes, was pledged and depledged.
0.5	0.4	Yes, I pledged but was not made active.
48.1	41.6	No, I preferred not to join.
20.1	32.3	No, none on my campus.
7.7	7.5	No, pledging comes later.
100.0	100.0	

		44. How well do you like college?
59.4	70.8	Very well.
34.4	24.7	Fairly well.
4.9	3.2	Not very well.
1.3	1.3	Not at all.
100.0	100.0	

Responses to the Eleventh-Grade Mailed Questionnaires

(Percentages Based on Unweighted Frequencies)

Males	Females	
		1. Are you married?
0.8	3.4	Yes, I married while still in high school.
3.7	11.3	Yes, I married after leaving high school.
95.5	85.3	No.
100.0	100.0	
		2. Did you graduate from high school?
95.4	95.8	Yes.
1.1	0.6	No, but I am still in high school, and expect to graduate.
--	--	No, I am still in high school, but expect to leave without graduating.
3.5	3.6	No, I dropped out of high school without graduating.
100.0	100.0	
		3. If you dropped out of high school without graduating, what was the reason?
20.6	11.3	To get a job.
3.9	5.9	I became ill.
5.7	3.2	I was needed at home.
7.6	48.3	I got married.
13.0	8.1	I did not like school.
16.4	8.2	I had failing grades.
5.8	1.2	I was asked to leave.
27.0	13.8	I left for some other reason.
100.0	100.0	
		4. Have you a job (as of April 30, 1962)?
41.7	38.2	Yes, a full-time job (35 hrs./wk.)
16.8	12.9	Yes, a part-time job (less than 35 hrs./wk.)
41.5	48.9	No.
100.0	100.0	
		5. As of April 30, 1962 were you looking for a job?
17.4	17.0	Yes.
48.0	42.5	No, I had a job.
29.4	29.3	No, I was going to school and didn't want a job.
--	6.8	No, I am a housewife, and was not looking for an outside job.
0.2	0.5	No, my health would not permit it.
5.0	3.9	No, I was not looking for a job for reasons other than those listed above.
100.0	100.0	

Males	Females	
		6. What kinds of school have you attended since leaving high school? (Mark as many as apply.)
25.2	37.3	None, omit.
46.0	35.7	A college offering bachelor's degree or higher.
10.2	7.7	A junior or community college.
3.8	0.9	A technical institute.
--	3.2	A school of nursing (3 year program).
--	0.8	A school of practical nursing.
1.5	7.4	A secretarial or business school.
2.6	2.1	A trade or apprentice school.
7.3	0.2	An armed forces enlisted man's school.
3.4	4.7	Other.
100.0	100.0	
		7. Have you made any important decisions that you are sorry about now? (Mark as many as apply.)
7.5	6.8	I am sorry I didn't go to college.
--	--	I am sorry I started college.
2.1	2.2	I am sorry about the kind of work I decided to do.
90.7	91.5	None of the above.
		8. Of which of the following are you now a member?
0.2	--	Air Force Reserve.
0.7	--	Army Reserve.
1.4	--	Naval Reserve.
0.4	--	Marine Corps Reserve.
--	--	Coast Guard Reserve.
0.1	--	Air National Guard.
1.0	--	Army National Guard.
5.7	--	Air ROTC.
8.6	--	Army ROTC.
0.6	--	Naval ROTC.
81.3	100.0	None of the above.
100.0	100.0	
		9. Are you now on active duty in the military service?
4.2	0.1	Yes, Air Force.
3.1	0.2	Yes, Army.
4.2	0.1	Yes, Navy.
1.3	--	Yes, Marine Corps.
0.2	--	Yes, Coast Guard.
2.4	0.1	No, but I have been on active duty.
17.3	--	No, but I expect to be drafted.
25.0	0.8	No, but I expect to enlist voluntarily.
42.3	98.7	No, and I do not expect to be.
100.0	100.0	

Responses to the Eleventh-Grade Mailed Questionnaires (cont.)

		10. Have you a military serial number? (Do not give your selective service number.)
82.9	99.4	No.
17.1	0.6	Yes.
100.0	100.0	
		11. Would you like to serve in the Peace Corps?
2.8	1.7	Yes, for a 4-year period.
1.2	0.8	Yes, for a 3-year period.
7.4	7.7	Yes, for a 2-year period.
8.0	11.5	Yes, for a 1-year period.
37.9	34.8	No, although I am familiar with it.
42.7	43.5	No, I am not familiar with it.
100.0	100.0	
		12. Have you attended college since leaving high school?
50.9	42.3	Yes, I am a full-time student.
3.7	2.6	Yes, I am a part-time student.
5.9	3.4	Yes, I entered but have dropped out temporarily.
1.2	2.9	Yes, I entered but dropped out and do not plan to return.
8.7	5.1	No, but I plan to enter college within a year or two.
11.5	7.2	No, but I plan to enter college eventually; I have no idea when.
18.1	36.5	No, and I have no plans to do so.
100.0	100.0	
		13. When did you enter college for the first time?
--	--	Summer, 1960.
0.4	0.5	Fall, 1960.
0.6	1.1	Spring, 1961.
4.6	4.2	Summer, 1961.
89.6	90.6	Fall, 1961.
4.8	3.6	Spring, 1962.
100.0	100.0	
		14. Are you still in college?
88.0	86.9	Yes.
12.0	13.1	No. I dropped out.
100.0	100.0	
		If you dropped out of college, what was your main reason?
3.8	7.5	I was offered a good job.
0.4	1.6	I became homesick.
1.1	0.6	I didn't enjoy the social life.
3.1	14.4	I got married.
7.1	3.7	College work was boring.
1.4	1.5	I had to study too hard.
6.0	3.2	I was afraid I was going to fail.
18.9	8.6	I failed.
23.1	15.4	Financial difficulties.
4.2	6.4	I became ill.
1.2	2.4	Family emergency.
25.1	29.8	Some other reason.
4.6	4.9	No reason.
100.0	100.0	
		15. In which of the following areas do you expect to specialize or "major" in college? Mark ONE even if you haven't made up your mind definitely. Please MARK ONLY ONE.
5.5	4.0	Mathematics.
7.7	1.6	Physical sciences.
9.0	4.9	Biological sciences.
8.8	7.4	Social studies.
3.3	8.9	English and literature.
1.1	4.8	Foreign languages.
1.8	3.8	Fine arts.
1.5	2.6	Music.
2.9	4.2	Psychology.
1.0	0.3	Philosophy.
1.3	0.6	Religion.
5.4	26.6	Education.
18.6	0.3	Engineering.
18.3	10.3	Business and commerce.
--	4.8	Home economics.
3.1	--	Agriculture and forestry.
--	6.1	Nursing.
10.7	8.8	Some other.
100.0	100.0	
		16. Which of the following college degrees or diplomas do you plan to earn? (Mark as many as apply.)
47.3	62.6	None, omit.
2.0	2.0	Associate in Arts (2 years).
23.5	20.1	B.A. or B.S.
10.0	7.5	M.A. or M.S.
5.1	1.4	Ph.D.
1.9	4.1	Ed.D. (education).
3.0	0.2	LL.B. (law).
3.2	0.4	M.D. (medicine).
1.1	--	D.D.S. (dentistry).
2.9	2.3	Other.
100.0	100.0	

Responses to the Tenth-Grade Mailed Questionnaires

(Percentages Based on Unweighted Frequencies)

Males	Females	
		1. Are you married?
0.9	4.1	Yes, I married while I was in high school.
7.1	17.8	Yes, I married after I left high school.
92.0	78.1	No.
100.0	100.0	
		2. Were you still in high school as of Dec. 1, 1963?
6.6	5.8	No, I had dropped out of high school.
91.5	93.0	No, I had graduated from high school.
--	--	Yes, in grade 10.
0.2	0.1	Yes, in grade 11.
1.7	1.1	Yes, in grade 12.
100.0	100.0	
		3. What was the last grade you completed in high school?
0.4	0.1	9
2.9	2.3	10
3.1	3.1	11
93.6	94.5	12
100.0	100.0	
		4. Did you get a high-school diploma?
91.9	93.3	Yes, at the time I finished grade 12.
1.7	0.5	Yes, by examination after I left high school.
0.1	0.1	No, I entered college at the end of grade 11.
4.9	5.4	No, I dropped out of high school.
1.0	0.5	No, I went through grade 12 but did not get a diploma.
0.4	0.2	No, I am still in high school.
100.0	100.0	
		5. If you dropped out of school without graduating why was this? (Mark as many as apply.)
48.4	47.5	I needed to work and earn some money.
45.6	48.1	I didn't like school.
23.8	18.0	I wasn't learning anything useful to me.
66.9	21.9	I was failing in my studies.
29.8	2.6	I got into trouble with the people at school.
14.9	79.6	I got married.
19.9	39.7	I got sick.
55.9	45.4	I was needed at home.
29.0	20.2	I felt that I was too old to stay in school.
12.5	14.4	Friends of my age were already out of school.
15.3	6.6	I was asked to leave the school.
75.5	81.6	I left for some other reason.
		6. In high school, what course of study did you take?
30.5	21.8	General.
52.6	45.7	College preparatory.
4.3	24.8	Commercial or business.
4.9	1.2	Vocational.
1.7	--	Agriculture.
6.0	6.5	Other.
100.0	100.0	
		7. How long did it take you to find the first full-time job you had after you left high school?
40.6	30.7	I found it before I left high school.
11.6	8.9	Less than 1 week.
11.0	9.2	1-2 weeks.
10.6	10.7	3-4 weeks.
6.7	7.7	2 months.
5.5	7.7	3-4 months.
3.0	4.7	5-6 months.
4.1	8.5	7-12 months.
6.9	11.9	Over a year.
100.0	100.0	
		8. Did you have a job as of December 1, 1963?
45.2	51.9	No.
54.8	48.1	Yes.
100.0	100.0	
		9a. How long have you worked on that job?
2.6	2.9	Less than 1 month.
29.1	29.2	1-6 months.
19.5	22.6	7-12 months.
34.2	40.3	1-2 years.
14.6	5.0	More than 2 years.
100.0	100.0	
		9b. For whom did you work on that job?
3.5	2.4	For myself.
2.1	0.3	For a business I own in part.
20.0	4.6	For the U. S. Government.
1.5	2.5	For a state government.
1.2	1.7	For a local government.
3.4	7.0	For a school or college.
68.3	81.5	For some other business or organization.
100.0	100.0	

Responses to the Tenth-Grade Mailed Questionnaires (cont.)

		10. As of December 1, 1963, were you looking for a job?
6.5	6.4	Yes, a full-time job.
4.0	2.9	Yes, a part-time job.
48.9	45.0	No. I had a job.
34.4	32.2	No, I was in school and didn't want a job.
--	9.2	No, I am a housewife.
0.3	0.6	No, my health would not permit it.
5.9	3.7	No, for a reason not given above.
100.0	100.0	

		11. What kinds of school have you attended since leaving high school? (Mark as many as apply.)
19.7	31.4	None.
49.8	40.2	A college offering the bachelor's degree or higher.
11.0	8.1	A junior or community college.
4.3	1.2	A technical institute.
--	3.5	A school of nursing (3-year program).
--	1.0	A school of practical nursing.
1.6	7.7	A secretarial or business school.
3.6	3.5	A trade or apprentice school.
7.9	0.2	An armed forces enlisted-man's school.
2.1	3.2	Other.
100.0	100.0	

		12. Have you made any important decisions that you are sorry about now? (Mark as many as apply.)
9.8	8.4	I am sorry I didn't go to college.
0.9	0.5	I am sorry I started college.
2.3	2.4	I am sorry about the kind of work I decided to do.

		13. On December 1, 1963 were you on active military duty?
3.5	0.1	Yes, in the Air Force.
3.5	0.2	Yes, in the Army.
4.1	--	Yes, in the Navy.
1.3	--	Yes, in the Marine Corps.
0.2	--	Yes, in the Coast Guard.
2.8	0.1	No, but I was once on active duty.
16.2	--	No, but I expect to be drafted.
17.6	0.8	No, but I expect to enlist voluntarily.
50.8	98.8	No, and I do not expect to be.
100.0	100.0	

		14. Have you a military serial number? (Do not give your selective service number.)
83.5	99.5	No.
16.5	0.5	Yes.
100.0	100.0	

		15. Would you like to serve in the Peace Corps?
1.9	1.2	Yes, for a 4-year period.
0.7	0.5	Yes, for a 3-year period.
8.4	8.7	Yes, for a 2-year period.
7.9	12.6	Yes, for a 1-year period.
0.1	0.1	Yes.
45.9	46.1	No, although I am familiar with it.
34.9	30.5	No, I am not familiar with it.
0.2	0.3	No.
100.0	100.0	

		16. Have you attended college since leaving high school?
50.1	42.0	Yes, I was a full-time student on Dec. 1, 1963.
4.5	3.1	Yes, I was a part-time student on Dec. 1, 1963.
7.5	4.8	Yes, I entered but am now out temporarily.
1.5	3.9	Yes, but I dropped out and don't plan to return.
5.7	2.7	No, but I plan to enter college within a year or two.
10.4	6.9	No, but I plan to enter college later; I have no idea when.
20.3	36.6	No, and I have no plans to do so.
100.0	100.0	

		17. When did you enter college for the first time?
0.2	0.2	Summer, 1961.
1.1	1.3	Fall, 1961.
0.5	1.0	Spring, 1962.
4.2	4.6	Summer, 1962.
80.7	84.0	Fall, 1962.
3.6	2.7	Spring, 1963.
0.8	0.4	Summer, 1963.
8.9	5.8	Fall, 1963.
100.0	100.0	

		18. Are you still in college?
83.5	81.1	Yes.
16.5	18.9	No. I dropped out.
100.0	100.0	
		If you dropped out of college, what was your main reason?
3.0	6.0	I was offered a good job.
0.5	0.7	I became homesick.
0.9	0.6	I didn't enjoy the social life.
3.1	18.7	I got married.
6.0	2.7	College work was boring.
0.9	1.3	I had to study too hard.
5.8	3.7	I was afraid I was going to fail.
20.3	9.1	I flunked out.
1.1	0.6	I got into disciplinary troubles.

Responses to the Tenth-Grade Mailed Questionnaires (cont.)

25.4	17.8	Financial difficulties.
3.7	6.2	I became ill.
1.4	2.0	Family emergency.
25.6	27.2	Some other reason.
2.3	3.4	No reason.
100.0	100.0	

		19. Which of the following college degrees or diplomas do you plan to earn? (Mark as many as apply.)
43.8	58.8	None.
2.4	2.3	Associate in Arts (2 years).
25.8	22.6	B.A. or B.S.
10.5	8.7	M.A. or M.S.
5.2	1.5	Ph.D.
2.5	4.1	Ed.D. (education).
3.9	0.2	LL.B. (law).
3.2	0.4	M.D. (medicine).
0.9	--	D.D.S. (dentistry).
1.8	1.4	Other.
100.0	100.0	

		20. In which of the following areas do you expect to specialize or "major" in college? Mark ONE even if you haven't made up your mind. Please MARK ONLY ONE.
5.1	4.2	Mathematics.
7.4	1.5	Physical sciences (astronomy, physics, chemistry, etc.).
7.8	4.8	Biological sciences (botany, zoology, physiology, etc.).
14.5	11.3	Social studies (history, government, political science, civics, economics, geography, sociology, etc.).
3.5	10.3	English.
1.0	4.1	Foreign languages.
1.8	4.1	Fine arts.
1.5	2.5	Music.
3.5	4.4	Psychology.
1.1	0.3	Philosophy.
1.0	0.5	Religion.
3.2	22.8	Education.
15.6	0.1	Engineering.
19.5	9.9	Business and commerce.
0.1	4.2	Home economics.
3.1	0.1	Agriculture and forestry.
0.2	6.0	Nursing.
2.4	2.2	Physical education.
7.7	6.7	Some other.
100.0	100.0	

Responses to the Ninth-Grade Mailed Questionnaires

(Percentages Based on Unweighted Frequencies)

Males	Females	
		1. Are you married?
0.8	4.1	Yes, I married while I was in high school.
6.6	15.6	Yes, I married after I left high school.
0.4	0.9	No, but I was married for a while.
92.2	79.4	No, I was never married.
100.0	100.0	
		2. Will you be attending high school in the fall of 1964?
8.0	7.2	No, I dropped out of high school.
90.9	92.1	No, I have entered college or graduated from high school.
0.1	--	Yes, in grade 10.
0.2	0.2	Yes, in grade 11.
0.8	0.5	Yes, in grade 12.
100.0	100.0	
		3. Circle the last grade you completed in high school.
0.2	0.1	8
1.8	1.4	9
3.1	2.9	10
3.5	3.2	11
91.4	92.4	12
100.0	100.0	
		4. Did you get a high school diploma?
90.0	91.7	Yes, at the time I finished grade 12.
1.6	0.4	Yes, by examination after I left high school.
0.1	0.2	Yes, but I entered college at the end of grade 11.
0.1	0.1	No, I entered college at the end of grade 11.
6.6	6.8	No, I dropped out of high school.
0.9	0.5	No, I went through grade 12 but did not get a diploma.
0.7	0.3	No, I am still in high school.
100.0	100.0	
		5. If you dropped out of school without graduating why was this? (Mark as many as apply.)
55.3	49.0	I needed to work and earn some money.
44.5	50.6	I didn't like school.
22.3	18.1	I wasn't learning anything useful to me.
67.4	23.0	I was failing in my studies.
26.6	4.8	I got into trouble with the people at school.
15.9	77.3	I got married.
14.4	36.9	I got sick.
59.0	55.5	I was needed at home.
32.5	16.9	I felt that I was too old to stay in school.
19.0	15.4	Friends of my age were already out of school.
18.2	8.4	I was asked to leave the school.
69.9	80.8	I left for some other reason.
		6. In high school, what course of study did you take?
30.1	22.3	General.
51.4	45.1	College preparatory.
4.6	24.6	Commercial or business.
4.7	1.3	Vocational.
2.2	--	Agriculture.
7.0	6.7	Other.
100.0	100.0	
		7. How long did it take you to find the first full-time job you had after you left high school? (Include summer full-time jobs.)
0.8	0.5	I am still in high school.
43.7	35.2	I found it before I left high school.
14.1	10.4	Less than 1 week.
12.6	11.0	1-2 weeks.
9.8	11.4	3-4 weeks.
5.6	7.6	2 months.
5.3	8.8	3-6 months.
3.3	6.9	7-12 months.
4.8	8.2	Over a year.
100.0	100.0	
		8. Did you have any paid job as of August 1, 1964?
17.9	37.5	No.
82.1	62.5	Yes.
100.0	100.0	
		9a. How long have you worked on that job?
4.1	4.1	Less than 1 month.
50.5	47.6	1-6 months.
14.8	18.2	7-12 months.
18.9	24.2	1-2 years.
11.7	5.9	More than 2 years.
100.0	100.0	

Responses to the Ninth-Grade Mailed Questionnaires (cont.)

9b. For whom did you work on that job?

2.6	2.0	For myself.
1.7	0.4	For a business I own in part.
13.6	2.9	For the U. S. Government.
2.2	2.3	For a state government.
2.9	3.0	For a local government.
1.9	3.9	For a school or college.
75.1	85.5	For some other business, organization, or individual.
100.0	100.0	

10. As of August 1, 1964, were you looking for a job?

7.9	10.2	Yes, a full-time job.
4.6	4.2	Yes, a part-time job.
69.4	50.1	No, I had a job.
10.4	16.3	No, I was in school and didn't want a job.
--	8.9	No, I am a housewife.
0.3	0.7	No, my health would not permit it.
7.4	9.6	No, for a reason not given above.
100.0	100.0	

11. What kinds of school (either day or night) have you attended since leaving high school? (Mark as many as apply.)

21.7	30.8	None.
47.9	39.6	A college offering the bachelor's degree or higher.
11.7	9.0	A junior or community college.
3.8	1.0	A technical institute.
--	3.0	A school of nursing (3-year program).
--	1.0	A school of practical nursing.
1.3	7.2	A secretarial or business school.
3.6	3.5	A trade or apprentice school or vocational school.
6.6	0.2	An armed forces enlisted-man's school.
3.4	4.7	Other.
100.0	100.0	

12. Have you made any important decisions that you are sorry about now? (Mark as many as apply.)

6.5	5.3	I am sorry I didn't graduate from high school.
8.4	6.9	I am sorry I didn't go to college.
0.9	0.5	I am sorry I started college.
2.4	2.4	I am sorry about the kind of work I decided to do.

13. Of which of the following were you a member on August 1, 1964?

0.2	--	Air Force Reserve.
0.8	--	Army Reserve.
1.5	--	Naval Reserve.
0.5	--	Marine Corps Reserve.
0.1	--	Coast Guard Reserve.
0.1	--	Air National Guard.
1.3	--	Army National Guard.
4.1	--	Air ROTC.
6.0	--	Army ROTC.
0.4	--	Naval ROTC.
85.0	100.0	None of the above.
100.0	100.0	

14. On August 1, 1964, were you on active military duty?

2.9	0.1	Yes, Air Force.
3.1	0.1	Yes, Army.
3.6	0.1	Yes, Navy.
1.3	--	Yes, Marine Corps.
0.2	--	Yes, Coast Guard.
0.1	--	Yes.
3.1	0.1	No, but I have been on active duty.
11.9	--	No, but I expect to be drafted.
14.1	0.6	No, but I expect to enlist voluntarily.
59.2	98.6	No, and I do not expect to be.
0.5	0.4	No.
100.0	100.0	

15. Have you a military serial number? (Do not give your selective service number.)

85.5	99.6	No.
14.5	0.4	Yes.
100.0	100.0	

16. Would you like to serve in the Peace Corps?

1.5	1.1	Yes, for a 4-year period.
0.6	0.4	Yes, for a 3-year period.
7.0	8.5	Yes, for a 2-year period.
7.4	12.4	Yes, for a 1-year period.
0.3	0.5	Yes.
53.2	50.8	No, although I am familiar with it.
0.8	1.0	No.
29.2	25.3	I am not familiar with it.
100.0	100.0	

17. Have you attended college since leaving high school?

51.6	45.7	Yes, I was a full-time student in the school year ending in June 1964.
3.6	3.0	Yes, I was a part-time student in the school year ending in June 1964.
4.9	2.8	Yes, I entered but I dropped out temporarily.
1.2	1.9	Yes, but I dropped out and don't plan to return.
0.5	0.3	Yes.
7.6	4.3	No, but I plan to enter college within a year or two.

Responses to the Ninth-Grade Mailed Questionnaires (cont.)

10.7	7.3	No, but I plan to enter college later; I have no idea when.
19.7	34.2	No, and I have no plans to do so.
0.2	0.5	No, but perhaps later.
100.0	100.0	

18. When did you enter college for the first time?

0.1	0.1	April - June, 1962.
0.5	0.8	July - September, 1962.
--	--	October - December, 1962.
0.5	1.1	January - March, 1963.
4.1	5.1	April - June, 1963.
82.7	84.5	July - September, 1963.
1.0	0.7	October - December, 1963.
3.6	2.8	January - March, 1964.
0.9	0.6	April - June, 1964.
6.5	4.2	July - September, 1964.
0.1	0.1	October - December, 1964.
100.0	100.0	

19. Were you attending college at the end of the school year in June 1964?

84.8	87.8	Yes.
15.2	12.2	No. I dropped out before that.
100.0	100.0	

If you dropped out of college, what was your main reason?

3.0	4.7	I was offered a job.
0.5	1.1	I became homesick.
0.8	1.2	I didn't enjoy the social life.
2.0	13.6	I got married.
4.9	2.0	College work was boring.
1.2	0.7	I had to study too hard.
7.1	4.7	I was afraid I was going to fail.
7.0	9.3	I flunked out.
1.8	1.6	I got into disciplinary troubles.
18.6	12.9	I had financial difficulties.
5.1	8.9	I became ill.
2.0	3.1	There was a family emergency.
33.3	34.0	Some other reason.
2.7	2.2	No reason.
100.0	100.0	

20. Which of the following college degrees or diplomas do you plan to earn? (Mark as many as apply.)

5.0	10.7	None.
4.5	5.6	Associate in Arts.
43.8	52.8	B.A. or B.S. (e.g., B.S. in Ed., B.S. in Engin., etc.)
--	--	B.B.A.
1.8	1.4	Other bachelor's degree.
18.2	22.2	M.A. or M.S.
1.0	0.7	Other master's degree.
9.5	4.0	Ph.D.
0.5	0.5	Ed.D.
6.5	0.7	LL.B. (law).
5.8	0.9	M.D. (medicine).
1.9	--	D.D.S. (dentistry).
1.5	0.5	Other professional degree.
100.0	100.0	

21. In which of the following areas do you expect to specialize or "major" in college? Mark ONE even if you haven't made up your mind. Please MARK ONLY ONE.

4.9	4.1	Mathematics.
6.4	1.4	Physical sciences (astronomy, physics, chemistry, etc.).
8.4	4.5	Biological sciences (botany, zoology, physiology, etc.).
13.4	10.7	Social studies (history, government, political science, civics, economics, geography, sociology, etc.).
3.3	9.5	English.
0.9	4.6	Foreign languages.
1.7	3.7	Fine arts.
1.6	2.5	Music.
3.3	4.7	Psychology.
0.9	0.2	Philosophy.
0.7	0.5	Religion.
2.9	20.6	Education.
16.2	0.2	Engineering.
18.8	10.0	Business and commerce.
0.1	4.5	Home economics.
3.0	0.1	Agriculture and forestry.
0.1	5.9	Nursing.
2.7	2.3	Physical Education.
10.7	10.0	Some other.
100.0	100.0	

Appendix C

Comparisons of Respondents and Nonrespondents

Robert H. McMillen

Chapter 3 has already compared the post-high-school activities of respondents and nonrespondents. Using multiple discriminant analysis techniques, this appendix will compare data collected from these two groups in 1960 when they were still in high school. These data include 50 variables which have been grouped into five categories: (1) ability measures, (2) interests, (3) socioeconomic environment, (4) extracurricular participation, and (5) environmental stability. The samples selected for comparison were 10 per cent of the tenth-grade class of 1960 who responded to the mailed follow-up questionnaire and 5 per cent of the young people from the same class who did not respond.

Ability Measures

The first group of variables studied was ability measures. The mean scores and F ratios for the nine tests included in this category are shown in Table C-1. Respondents, both male and female, had higher mean scores on each test than the male and female nonrespondents, respectively. Each of these tests significantly differentiated the respondent and nonrespondent groups. For males, R-192 (Information Total) and R-230 (English Total) were the most significant variables in separating those who completed a mailed questionnaire and those who did not. Female respondents and nonrespondents were best discriminated by R-250 (Reading Comprehension) and R-190 (Information Part I). Sports Information (R-115) was the least significant variable for separating male respondents and nonrespondents; R-260 (Creativity) was the least important for the female groups.

Interests

The second area in which respondents and nonrespondents were compared was interest in various occupations and career-related activities. Table C-2 shows that the young people who completed a mailed questionnaire

Table C-1

Abilities of Respondents and Nonrespondents

	Males			Females		
	Respondents (N=385)	Nonrespondents (N=187)		Respondents (N=536)	Nonrespondents (N=255)	
Variables	Mean	Mean	F-ratio[a]	Mean	Mean	F-ratio[a]
R-106 (Math Info)	11.74	8.54	53.16	9.28	7.13	43.66
R-230 (English Total)	83.96	75.36	63.16	88.13	81.64	66.41
R-250 (Reading Comp)	33.86	27.52	51.53	33.90	28.08	68.64
R-260 (Creativity)	10.61	8.60	31.07	9.14	7.91	20.45
R-290 (Abst. Reasoning)	9.78	8.38	28.08	9.54	7.99	52.58
R-340 (Math Total)	26.51	21.02	51.20	23.57	19.83	42.08
R-115 (Sports Info)	8.90	7.81	18.92	6.12	5.16	26.58
R-192 (Info Part II)	80.25	66.56	74.90	74.29	64.64	58.71
R-190 (Info Part I)	156.55	131.70	70.25	134.50	115.89	68.58

[a] F ratios greater than 6.7 are significant at the 1 per cent level.

Table C-2

Interests of Respondents and Nonrespondents

	Males			Females		
	Respondents (N=385)	Nonrespondents (N=187)		Respondents (N=536)	Nonrespondents (N=255)	
Variables	Mean	Mean	F-ratio[a]	Mean	Mean	F-ratio[a]
P-701 (Physical Sciences)	22.66	20.42	8.40	13.34	11.42	9.94
P-702 (Biological Sciences)	19.93	18.80	1.75	18.06	16.58	3.19
P-703 (Public Service)	18.69	17.86	.64	12.43	12.68	.09
P-704 (Literary)	16.51	16.40	.02	21.68	21.26	.40
P-705 (Social Service)	15.96	16.72	1.45	24.56	24.05	.92
P-706 (Artistic)	16.24	17.23	1.58	21.49	20.20	3.10
P-707 (Music)	13.78	14.42	.43	19.21	17.47	3.96
P-708 (Sports)	26.57	27.25	.65	20.28	19.93	.24
P-709 (Outdoor Recreation)	25.80	28.28	6.78	15.30	14.38	1.13
P-710 (Business Management)	19.59	20.43	1.81	15.63	16.13	.73
P-711 (Sales)	16.65	17.39	.97	13.86	12.81	2.52
P-712 (Computational)	17.03	16.11	1.69	15.31	15.18	.04
P-714 (Mech - Technical)	18.89	20.97	8.67	8.29	8.00	.36
P-715 (Skilled Trades)	11.45	14.20	19.65	8.09	8.17	.04
P-716 (Farming)	19.12	20.60	2.62	14.00	13.62	.30

[a] F ratios greater than 6.7 are significant at the 1 per cent level.

and those who did not were significantly different on only a few of these 15 variables. P-701 (Physical Sciences) was the only variable on which female respondents and nonrespondents differed, while only P-701, P-709 (Outdoor Recreation), P-714 (Mechanical-Technical), and P-715 (Skilled Trades) separated the two groups of young men. On 10 of the 15 variables in this category, the male nonrespondents had higher scores than the male respondents; female respondents scored higher on 12 of the 15 variables than the young women who did not complete a questionnaire.

Extracurricular Participation

Male and female respondents and nonrespondents were also compared in terms of their participation in various sets of extracurricular activities. These sets included: school-related organizations or clubs, hobbies, games or sports, and working for pay. The mean scores of respondents and nonrespondents for each of these sets are given in Table C-3. The intensity score is the total amount of participation in each set of activities; the breadth score is the total number of different activities within each set in which participation occurred. For one variable, working for pay, only the intensity score was studied.

In participation in organizations and clubs, male and female nonrespondents had higher mean scores (both intensity and breadth) than male and female nonrespondents, respectively. This variable, however, did not significantly separate male respondents and nonrespondents; only in the breadth of participation did female respondents differ from young women who did not complete a questionnaire. The second set of activities, participation in hobbies, was of little importance in differentiating respondents and nonrespondents. Both the intensity and breadth of participation in games and sports, the third set of activities, revealed differences between male respondents and nonrespondents, the respondents having higher scores. However, this same variable had little to do with differentiating the two female groups. On the fourth variable, working for pay, nonrespondents of both sexes had higher mean scores than nonrespondents. The F ratios indicated that the differences between groups were significant.

Table C-3

Extracurricular Participation of Respondents and Nonrespondents

	Males			Females		
	Respondents (N=385)	Nonrespondents (N=187)		Respondents (N=536)	Nonrespondents (N=255)	
Variables	Mean	Mean	F-ratio[a]	Mean	Mean	F-ratic[a]
Organization Intensity	20.64	21.13	.59	21.02	22.08	4.31
Organization Breadth	3.26	3.53	2.16	3.14	3.58	11.07
Hobbies Intensity	39.64	40.26	.61	36.47	36.84	.43
Hobbies Breadth	10.36	10.26	.13	8.59	8.62	.04
Games and Sports (Intensity)	20.79	19.73	9.27	19.12	18.97	.29
Games and Sports (Breadth)	4.62	4.43	8.69	4.23	4.21	.11
Work Intensity	16.92	18.16	7.59	14.65	15.66	8.13

[a] F ratios greater than 6.7 are significant at the 1 per cent level.

Socioeconomic Environment

P*801, the next variable on which respondents and nonrespondents were compared, estimates the general socioeconomic environment of the individual. This variable is composed of nine items from the 1960 Project TALENT Student Information Blank. These items concern: mother's education, father's education, father's occupation, number of books in the home, whether or not the individual has his own room, the extent to which luxury appliances and electronic equipment are present in the home, the family's income, and the value of the house in which the individual lives. The mean score of the male respondents on this variable was 102.31 compared to 97.53 for the male nonrespondents. The female respondents' mean score was 101.10, while 96.85 was the score of the young women who did not complete a questionnaire. These scores indicated that respondents were from better socioeconomic environments than nonrespondents. The F ratios of 30.04 for the male groups and 34.30 for the females clearly showed that P*801 significantly differentiated respondents and nonrespondents.

Environmental Stability

Respondents and nonrespondents were also compared on variables indicating environmental stability (Table C-4). These variables were: SIB-92 (number of school changes), SIB-93 (time since last school change), SIB-96 (number of school days absent), SIB-97 (hours per day spent studying), and SIB-167 (time lived in same community). The absolute values of the mean scores listed in Table C-4 should not be interpreted, since the variables were all recoded. These scores, however, indicate that respondents changed schools fewer times than nonrespondents, were absent from school less, and studied more. The time spent in their present school and community was greater for respondents than nonrespondents. On each of these variables, the young women who completed a questionnaire and those who did not were significantly different. However, only three of the variables--SIB-92, SIB-93, and SIB-97--clearly separated the male respondents and nonrespondents.

Table C-4

Environmental Stability and Future Plans of Respondents and Nonrespondents

	Males			Females		
	Respondents (N=385)	Nonrespondents (N=187)		Respondents (N=536)	Nonrespondents (N=255)	
Variables	Mean[a]	Mean	F-ratio[b]	Mean	Mean	F-ratio[b]
SIB-92 (School changes)	4.70	4.18	12.51	4.91	4.28	27.43
SIB-93 (Last school change)	4.61	4.17	7.77	4.94	4.18	36.88
SIB-96 (School days absent)	4.43	4.25	2.88	4.35	4.06	9.12
SIB-97 (Hours of study per week)	3.62	3.27	10.82	3.85	3.55	10.80
SIB-167 (Time living in same community)	4.86	4.59	4.34	4.93	4.54	11.48
SIB-304 (Greatest amount education planned)	4.52	3.80	29.92	4.05	3.63	15.55
SIB-347 (Total occupations considered)	3.53	3.16	11.24	3.45	3.23	6.02

[a] Mean scores should not be interpreted, since variables have been recoded. See text for explanations.

[b] F ratios greater than 6.7 is significant at the 1 per cent level.

Summary

Just as Chapter 3 has shown that the post-high-school activities of respondents and nonrespondents were quite different, this appendix has shown that data collected from these two groups in 1960 were also significantly different. The first comparison showed that respondents had higher mean scores on the ability measures studied than nonrespondents. However, the interests and activities of these two groups as determined by the 1960 Student Interest Inventory and Student Activities Inventory respectively, did not differ a great deal. Other comparisons revealed that nonrespondents participated more in organizations and clubs than respondents, but less in games and sports. Nonrespondents also spent more time working for pay than the young people who completed a questionnaire. When backgrounds were compared, it was found that nonrespondents tended to come from environments which were less stable and of a lower socioeconomic level than those of respondents. The final comparisons showed that respondents planned more education and seriously considered more occupations than did nonrespondents.

Appendix D

Occupations Included in Job and Career Plan Categories (Chapter 3)

	Page
Occupations Included in Each of the 13 Job Categories	D-2
Occupations Included in Each of the 18 Career Categories	D-3

Table D-1

Occupations Included in Each of the 13 Job Categories Listed in Tables 3-9 and 3-10

1. Health professions - Biological scientist (includes pharmacologist), physician, surgeon, dentist, veterinarian, professional nurse, dietitian, home economist, pharmacist
2. Government, law - Government (civil service, foreign service, government official, Peace Corps , etc.), lawyer, judge
3. Teacher, librarian - Teacher, librarian
4. Business - Accountant, auditor, business, industry, agent, broker, dealer, manager, salesman
5. Creative, cultural - Author, editor, reporter, musician, artist, entertainer, performer, model
6. Scientific, medical technician - Computer programmer, analyst, technician (science, engineering), aviation, surveyor, draftsman, photography, therapist (occupational, physical, etc.), technician (medical, X-ray, etc.)
7. Clerical, sales - Tabulating operator, bookkeeper, stenographer, secretary, telephone operator, cashier, keypunch operator, typist, other clerical (clerk, office machine operator, etc.), sales clerk, other sales (routeman, door-to-door sales, collector, etc.)
8. Protective - Armed Forces, Merchant Marines, policeman, fireman, etc.
9. Skilled worker - Electronic technician, electrician, machinist, mechanic, repairman, carpenter, cabinetmaker, metal trades, painter, construction, maintenance, plumber, pipefitter, roadbuilding, earth-moving equipment operator, other building and construction, clothing and fashion trades, printing
10. Service worker - Waiter, waitress, busboy, hairdresser, cosmetologist, manicurist, barber, practical nurse, nurses' aide, etc., baker, chef, cook, other service workers (household worker, bartender, masseur, etc.)
11. Unskilled worker - Railroad, driver, farm, ranch laborer, mining, quarrying, oil-drilling, other laborers
12. Outdoors - Recreation, sports, farm or ranch owner, manager, outdoors (forestry, fishing, gardening, etc.)
13. All other - All other

Table D-2

Occupations Included in Each of the 18 Career Categories Listed in Tables 3-11, 3-21, and 3-22

1. Physical scientist - Mathematician, physicist, chemist, other physical scientists (astronomer, geologist, meteorologist, etc.)

2. Engineer, architect - Engineer, architect

3. Health professions - Biological scientist (includes pharmacologist), physician, surgeon, dentist, veterinarian, professional nurse, dietitian, home economist, pharmacist

4. Social scientist - Social scientist, psychologist, counseling, guidance (non-psychologist), social or welfare worker, religion, theology, other professionals (applied social sciences, linguist, educational research)

5. Government, law - Government (civil service, foreign service, government official, Peace Corps, etc.), lawyer, judge

6. Teacher, librarian - Teacher, librarian

7. Business - Accountant, auditor, business, industry, agent, broker, dealer, manager, salesman

8. Creative, cultural - Author, editor, reporter, musician, artist, entertainer, performer, model

9. Scientific, medical technician - Computer programmer, analyst, technician (science, engineering), aviation, surveyor, draftsman, photography, therapist (occupational, physical, etc.), technician (medical, X-ray, etc.)

10. Clerical, sales - Tabulating operator, bookkeeper, stenographer, secretary, telephone operator, cashier, keypunch operator, typist, other clerical (clerk, office machine operator, etc.), sales clerk, other sales (routeman, door-to-door sales, collector, etc.)

11. Protective - Armed Forces, Merchant Marines, policeman, fireman, etc.

12. Skilled worker - Electronic technician, electrician, machinist, mechanic, repairman, carpenter, cabinetmaker, metal trades, painter, construction, maintenance, plumber, pipefitter, roadbuilding, earthmoving equipment operator, other building and construction, clothing and fashion trades, printing

Table D-2 (cont.)

Occupations Included in Each of the 18 Career Categories Listed in Tables -11, -21, and -22

13. Service worker - Waiter, waitress, busboy, hairdresser, cosmetologist, manicurist, barber, practical nurse, nurses' aide, etc., baker, chef, cook, other service workers (household worker, bartender, masseur, etc.)

14. Unskilled worker - Railroad, driver, farm, ranch laborer, mining, quarrying, oil-drilling, other laborers

15. Outdoors - Recreation, sports, farm or ranch owner, manager, outdoors (forestry, fishing, gardening, etc.)

16. Housewife - Housewife

17. All other - All other

18. Don't know - Don't know

Appendix E

Socioeconomic Environment and Student Abilities[1]

For many decades psychologists have wrestled with the problem of the extent to which home environmental factors influence the development of a student's intellectual abilities. During the past decade concern with the implications of this problem has steadily become more widespread. This concern has not been unfounded as many studies have demonstrated that several aspects of social and economic conditions in the home are positively related to ability measures. Of course, these studies did not tell us whether the home environment or the parents' genes produced the relationships. Although our twin studies may contribute to the understanding of this nature-nurture difference, the purpose of this appendix is to explore further the nature of these environmental-ability relationships and to describe Project TALENT's socioeconomic environmental dimension (P*801) which was used for the first time in this follow-up report.

A review of previous research showed only the expected relationship between socioeconomic status and some general measure of scholastic ability. Heimann and Schenk (1954) and Coster (1959), for example, demonstrated that grades in school were directly related to socioeconomic status. In another study Allison Davis (1948) found that on four of the 10 most widely used standard intelligence tests more than 90 per cent of the items showed differences in results for two (high and low) socioeconomic groups. On only one test did fewer than one-half of the items differentiate between the groups. Eels, et al., (1951) concluded that children from the middle and upper social classes scored much higher than lower class children on items "essentially linguistic or scholoastic in nature," while items of a more practical or perceptual nature showed the smallest differences between the two groups. In a field study these same researchers found that the correlation between I.Q. and socioeconomic status varied from .20 to .43, depending upon the tests used and the age levels tested.

Knief and Stroud (1959) later found that four different standard

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[1] This appendix has been the joint effort of several staff members including William W. Cooley, Carol J. Dalcanton, and Robert H. McMillen.

I.Q. tests correlated significantly with social status, and that in the Iowa Tests of Basic Skills (ITBS), socioeconomic status was more highly correlated with language and vocabulary than with reading comprehension and arithmetic. Another study by Baker, et al., (1961) reported that the correlations between socioeconomic status and each of seven achievement areas ranged from a low of .23 for mechanics of English to a high of .47 for vocabulary. Curry (1962) found that although socioeconomic factors had an effect on reading and language achievement, they did not seem to influence arithmetic achievement as much. Hill and Giammatteo's (1963) findings were somewhat different. Of the third graders tested in their study, students with high socioeconomic status were three to eight months ahead of those students with low socioeconomic status in vocabulary achievement, six months ahead in arithmetic skills, nine months ahead in reading comprehension achievement, and eleven months ahead in problem solving.

Project TALENT's studies of the relationship between socioeconomic environment and ability measures used 25 Student Information Blank items measuring socioeconomic status and 14 ability measures. The SIB items included in the analyses presented in this chapter were:

(1) Number of people father supervises on job (SIB-132)
(2) Father's responsibilities on job (SIB-133)
(3) Business and professional associations in which father is involved (SIB-142)
(4) Rent of home (SIB-171)
(5) Value of home (SIB-172)
(6) Family income (SIB-173)
(7) Family finances (SIB-174)
(8) Number of books (SIB-176)
(9) News magazines (SIB-182)
(10) Culture magazines (SIB-187)
(11) Literary magazines (SIB-188)
(12) Number of appliances (SIB-190)
(13) TV, radio, etc. (SIB-191)
(14) Luxury items (SIB-192)

(15) Cultural equipment (SIB-193)
(16) Sports equipment (SIB-194)
(17) Own room, desk, etc. (SIB-195)
(18) Number of hand tools (SIB-196)
(19) Number of power tools (SIB-197)
(20) Number of cars owned (SIB-198)
(21) Year of car owned (SIB-199)
(22) Father's occupation (SIB-206)
(23) Father's education (SIB-218)
(24) Mother's education (SIB-219)
(25) Number of rooms in home (SIB-225)

Included in the ability measures used were two composites of 38 scales from the TALENT Information tests. These tests were divided into two parts, primarily on the basis of whether or not the subjects covered were usually taught in school. Part I includes school material, together with certain areas not ordinarily part of the school curriculum. The items in Part II are primarily nonacademic in nature. Other ability measures in the analyses included: Memory for Words; Disguised Words; English Total which includes Spelling, Capitalization, Punctuation, English Usage and Effective Expression; Word Functions in Sentences; Reading Comprehension; Math Total; Creativity; Visualization in Two and Three Dimensions; Mechanical Reasoning; Abstract Reasoning; and Arithmetic Computation.

The purpose of the following analyses was to determine which of the 25 socioeconomic items were highly correlated with these 14 ability measures. In the first analysis (Table E-1) each socioeconomic item was correlated with each ability measure. A 10 per cent sample of the males tested in 1960 as twelfth graders was used. Although 2,946 boys were included in the analysis, the N for each correlation varied because some of the items (e.g., rent of home) were not applicable to all boys. All reported correlations were significant at the .01 level.

Table E-1 indicates that nine of the 25 socioeconomic items were highly correlated with several ability measures. In terms of the number of abilities with which it was highly correlated, the most outstanding

Table E-1

Correlations between SIB Items and Ability Tests

(r greater than .10, max. N=2, 946 grade 12 males)

	R-190 Info., I	Info., II	R-212 Memory Words	R-220 Disg. Words	R-230 Eng. Total	R-240 Word Funct.	R-250 Read. Comp.	R-260 Creativity	R-270 Mech. Reas.	R-281 Vis. 2D	R-282 Vis. 3D	R-270 Abst. Reas.	R-340 Math Total	F-410 Arith. Comp.
1. Supervision														
2. Responsibilities	.14	.14				.10	.10	.11	.12			.10	.11	
3. Business assoc.														
4. Rent of home	.12												.12	
5. Value of home	.20	.21		.15	.14	.14	.16	.13	.11			.13	.18	
6. Family income	.16	.18		.10	.11	.10	.13		.11				.14	
7. Family finances														
8. Books in home	.28	.29	.11	.20	.20	.21	.25	.19	.18			.18	.24	
9. News mags.														
10. Culture mags.														
11. Literary mags.	.14	.15		.13		.11	.12	.10		.14			.12	
12. Appliances	.24	.26		.15	.17	.15	.21	.18			.14	.18	.21	
13. TV, radio, etc.	.33	.35	.15	.22	.28	.20	.33	.24	.24		.19	.29	.28	.22
14. Luxury items		.10												
15. Cultural equip.	.17	.16		.13	.11	.13	.11		.13		.10	.11	.13	
16. Sports equip.	.17	.18					.13	.12	.19	.10	.12	.11	.12	
17. Own room, desk	.30	.30	.14	.22	.26	.21	.25	.21	.19	.10	.16	.21	.27	.15
18. Hand tools	.17	.14					.10	.15	.24	.16	.21	.13	.11	
19. Power tools									.16		.11			
20. Cars owned									.14					
21. Year of car	.12	.14			.10		.10					.10	.11	
22. Father's occup.	.26	.24		.15	.19	.22	.19	.17	.19		.13	.15	.25	.11
23. Father's educ.	.27	.26	.12	.19		.23	.23	.17	.15		.11	.18	.27	
24. Mother's educ.	.27	.27		.16	.20	.19	.22	.18	.15		.12	.18	.23	
25. Rooms in home		-.11					-.10							-.12

of these variables was the presence of television sets, radios, telephones, etc., in the home. The highest correlations of this variable were with Information Part II, Information Part I, and Reading Comprehension (r = .35, .33, and .33 respectively). The student's access to a private room and its furnishings (desk, typewriter, etc.) was the second most outstanding variable when again considering correlations with ability measures. These abilities tended to be the same abilities influenced by the presence of TV sets, radios, etc. The difference between these two socioeconomic items, presence of TV, etc., and having own room, etc., in their relationship to abilities was primarily that the correlations for TV sets, etc., were higher. The correlations among the socioeconomic items are presented in Table E-2. In this table the correlation between TV sets, etc., and access to a private room was .32.

Two other socioeconomic items found to be of interest in Table E-1 were the number of books and hand tools in the home. The number of books was most highly correlated with Information Parts I and II (r = .28 and .29). Reading Comprehension was the next most highly correlated ability (r = .25) followed by Math Total, Word Functions, English Total, and Disguised Words. Number of hand tools in the home was found to be fairly highly correlated with Mechanical Reasoning and Visualization in Three Dimensions (r = .24 and .21). Other socioeconomic variables noted to have substantial correlations with several abilities were: mother's education, father's education, and father's occupation. These items tended to influence Information Parts I and II more than any other abilities.

An overview of the data presented in Tables E-1 and E-2 indicates that several socioeconomic factors were correlated with several abilities. However, it should be noted that socioeconomic items tended to influence some abilities more than others. Knowledge in academic and nonacademic areas (Information Parts I and II) and Reading Comprehension, for example, were influenced more than Arithmetic Computation or Visualization in Two or Three Dimensions. In addition, Table E-2 shows that several of the socioeconomic items which influenced abilities were intercorrelated.

The next stage of analysis was multiple correlation. Using this

Table E-2

Intercorrelations among SIB Items

(r greater than .30)

SIB Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Responsibilities					.32															.39		
2. Business assoc.																				.34	.31	
3. Rent of home				.38	.40															.30		
4. Value of home			.38		.53	.34	.34				.34		.37	.32		.30			.34	.31	.31	
5. Family income	.32		.40	.53		.43					.37		.39	.32					.39	.34	.31	
6. Family finances				.34	.43								.30									
7. Books in home				.34										.35						.30	.37	.34
8. News mags.									.37	.40												
9. Culture mags.								.37		.31												
10. Literary mags.								.40	.31													
11. Appliances				.34	.37							.46	.39	.33	.34	.30						
12. TV, radio, etc.											.46		.33			.32						
13. Luxury items				.37	.39	.30					.39	.33		.39	.30							
14. Cultural equip.				.32	.32		.35				.33		.39		.30							
15. Sports equip.											.34		.30	.30								
16. Own room, desk				.30							.30	.32										
17. Hand tools																		.52				
18. Power tools																	.52					
19. Year of car				.34	.39																	
20. Father's occup.	.39	.34	.30	.31	.34		.30														.45	.32
21. Father's educ.		.31		.31	.31		.37													.45		.51
22. Mother's educ.							.34													.32	.51	

mode of statistical analysis, it was possible to determine the extent to which a linear combination of the 25 socioeconomic items was related to each of the ability measures. The multiple correlations for all 14 measures are listed in Table E-3. The highest multiple correlation was between Information Part II and all 25 socioeconomic items (r = .53). The correlation of these items with Information Part I (r = .52) was second highest, and with Reading Comprehension (r = .48), third. The lowest correlations were with Visualization in Three Dimensions (r = .33), Arithmetic Computation (r = .32), Memory for Words (r = .24), and Visualization in Two Dimensions (r = .24).

Also listed in Table E-3 are the 14 largest multiple correlations between each socioeconomic item and the 14 abilities. The presence of a TV set, radio, etc., was more highly correlated than any other item (r = .39). Access to a private room and its furnishings was second highest (r = .33) and number of books in the home was third (r = .31). From both the bivariate and multiple correlation analyses, it can be concluded that some socioeconomic items had a higher correlation with abilities than others.

A third way to consider relationships between socioeconomic items and ability variables is with canonical correlation. Table E-4 presents the three highest canonical correlations and the variables from the two sets of measures with the numerically highest canonical coefficients ("beta weights"). There were at least three independent ways in which socioeconomic information was related to ability. The largest of these canonical relationships was between the student's general information level and the extent to which information sources were available in his home. The second was primarily between mechanical skills and information (Information, Part I contains several scales in this area) and the opportunities in the home for their development. These relationships, along with the third canonical relationship, will be discussed more causually and with greater clarity when our factor analytic work and twin study are completed. Both are scheduled for completion next fall.

Table E-3

Multiple Correlations between Ability and Environment

Dependent Variable--Abilities	Multiple Correlation	Reliability[a] Coefficients
Information, Part II	.53	.936
Information, Part I	.52	.961
Reading Comprehension	.48	.859
Math Total	.46	.915
English Total	.44	.904
Mechanical Reasoning	.41	.778
Abstract Reasoning	.39	.655
Creativity	.38	.757
Word Functions	.37	.831
Disguised Words	.35	.836
Visualization in 3 Dimensions	.33	.731
Arithmetic Computation	.32	
Memory for Words	.24	.825
Visualization in 2 Dimensions	.24	.810

Dependent Variables--SIB Items	
TV, radio, etc.	.39
Own room, desk, typewriter, etc.	.33
Books in home	.31
Father's education	.31
Mother's education	.30
Appliances	.28
Hand tools	.28
Father's occupation	.28
Value of home	.24
Sports equipment	.22
Power tools	.22
Cars owned	.21
Family income	.20
Cultural equipment	.20

[a] See page 2-51 of The American High-School Student for explanation of these coefficients.

Table E-4

Canonical Correlations and Coefficients

$R_1 = .56$

Abilities	
.84	Information, Part II
.28	Information, Part I
.28	Abstract Reasoning

Environment	
.51	TV, radio, etc.
.37	Own desk, etc.
.30	Books in home
.26	Mother's education

$R_2 = .34$

Abilities	
.68	Mechanical Reasoning
.43	Information, Part I
-.29	Information, Part II
-.25	Reading Comprehension

Environment	
.48	Hand tools
.48	Cars owned
.30	Power tools
-.29	Luxury items
-.20	News magazines
-.20	TV, radio, etc.

$R_3 = .26$

Abilities	
.48	Math Total
-.42	Arithmetic Computation
.36	Word Functions
.34	Disguised Words

Environment	
.40	Culture magazines
-.38	Family income
-.36	TV, radio, etc.
.35	Rent of home

Socioeconomic Environment Index (SEE)

The final goal of this Appendix is a description of the variable P*801 created from nine Student Information Blank (SIB) items for purposes of locating each student along a general socioeconomic environment dimension.

Selection of the items was based upon several considerations. Primarily, the items selected had to be answerable by most of the students and had to measure aspects of the environment closely related to student ability. The purpose of the latter consideration was to produce an index which could control for home socioeconomic conditions in studies of school learning.

The nine items finally included in this SEE index are listed in Table E-5, together with the means and standard deviations used to standardize each item. The SEE index is a standard score (with a mean of 100 and a standard deviation of 10) based on the items the student answered from the nine possible ones. This score is computed as the sum of the standard scores for the items answered divided by an approximation of the standard deviation of the sum of n standard scores, where n represents the number of items answered. This "average" was then adjusted to give a mean of 100 and standard deviation of 10 for the population of grade 12 male high-school students.

$$\text{SEE Index} = \left[\frac{\sum\limits_{i=1}^{n} Z_i}{k_n} + 10 \right] 10$$

Where k_n is an approximation of the standard deviation of $\sum\limits_{i=1}^{n} Z_i$, which in turn is the sum of the standard scores of items responded to.

Experience with this index has shown that there are no sex differences within grade and that the mean goes down slightly from grade 12 to grade 9, consistent with high-school dropout rates. In the near future we plan to develop additional scales from the Student Information Blank to cover other aspects of the students' activities and home environment.

Table E-5
Items in the SEE Index (P*801)

SIB Item Number		Mean	Std. Dev.
172	Value of home	3.21	1.25
173	Family income	3.04	1.13
176	Books in home	3.29	1.16
190	Appliances	4.29	1.34
191	TV, radio, etc.	4.57	.86
195	Own room	2.82	1.01
206	Father's occupation (as scaled below)	3.06	1.26
218	Father's education	5.07	2.13
219	Mother's education	4.97	1.65

Scale Score	Item Code	Item 206 Response
1	3	C. Farm or ranch worker
	4	D. Workman or laborer
	5	E. Private household worker
2	7	G. Service worker
	8	H. Semi-skilled worker
3	2	B. Farm or ranch foreman
	6	F. Protective worker
	9	I. Skilled worker or foreman
	10	J. Clerical worker
4	1	A. Farm or ranch owner
	11	K. Salesman
	12	L. Manager
	14	N. Proprietor or owner
	16	P. Technical
5	13	M. Official
	15	O. Professional

Appendix F

Scaled Discriminant Vectors Resulting from the Analysis of Six Post-High-School Education Groups

Table F-1

Scaled Discriminant Vectors Resulting from the Analysis of Six Post-High-School Education Groups Using Information Variables

	Discriminant Functions			
	Male Analysis		Female Analysis	
Variable Name	I	II	I	II
1. R-102 Vocabulary	-.23	.03	-.11	-.01
2. R-103 Literature	-.13	.02	-.12	.28
3. R-104 Music	-.12	.02	-.06	.41
4. R-105 Social Studies	.22	.14	-.13	.03
5. R-106 Mathematics	-.73	-.59	-.89	-.02
6. R-107 Physical Science	-.12	.13	.03	-.37
7. R-108 Biological Science	-.19	.17	-.08	-.32
8. R-109 Scientific Attitude	-.10	.09	-.05	-.01
9. R-110 Aeronautics and Space	.10	.18	-.00	-.08
10. R-111 Electricity	.06	-.50	.11	-.13
11. R-112 Mechanics	.37	-.17	.03	.05
12. R-113 Farming	-.05	-.05	.01	-.01
13. R-114 Home Economics	.18	-.23	.16	-.43
14. R-115 Sports	-.25	.20	-.19	.17
15. R-131 Art	-.02	.07	.09	.23
16. R-132 Law	-.15	-.09	-.02	-.10
17. R-133 Health	-.05	.14	-.17	-.15
18. R-138 Military	-.09	.21	-.11	-.07
19. R-139 Accounting, Business	.03	.30	.07	.40
20. R-142 Bible	-.01	-.01	-.14	-.15
Per Cent of Trace	78.12	9.14	78.74	10.73

Table F-2

Scaled Discriminant Vectors Resulting from the Analysis of Six Post-High-School Education Groups Using Ability Variables

		Discriminant Functions			
		Male Analysis		Female Analysis	
	Variable Name	I	II	I	II
1.	R-211 Memory for Sentences	.24	.13	.01	-.10
2.	R-212 Memory for Words	-.10	-.10	.20	.16
3.	R-220 Disguised Words	-.00	.01	-.10	-.16
4.	R-230 English Total	-.30	-.30	.15	.21
5.	R-240 Word Functions in Sentences	-.39	-.35	.19	-.13
6.	R-250 Reading Comprehension	-.24	.26	.42	.56
7.	R-260 Creativity	-.04	.08	-.01	-.11
8.	R-270 Mechanical Reasoning	.27	.36	-.03	.04
9.	R-281 Visualization in Two Dimensions	.11	.26	-.13	.08
10.	R-282 Visualization in Three Dimensions	.07	.47	-.23	-.15
11.	R-290 Abstract Reasoning	-.09	.01	-.05	-.16
12.	R-340 Mathematics Total	-.69	.12	.77	-.50
13.	F-410 Arithmetic Computation	-.16	-.21	.07	.25
14.	F-420 Table Reading	-.11	.44	.17	.35
15.	F-430 Clerical Checking	.14	-.07	.03	-.20
16.	F-440 Object Inspection	-.02	.09	-.10	-.17
	Per Cent of Trace	76.13	12.43	86.32	5.46

Table F-3

Scaled Discriminant Vectors Resulting from the Analysis of Six Post-High-School Education Groups Using Temperament-Interest Variables

	Discriminant Functions			
	Male Analysis		Female Analysis	
Variable Name	I	II	I	II
1. R-601 Sociability	.02	-.08	.04	-.21
2. R-602 Social Sensitivity	-.06	.02	-.15	.00
3. R-603 Impulsiveness	-.07	.04	.03	-.03
4. R-604 Vigor	.05	-.05	.04	-.02
5. R-605 Calmness	.14	-.01	.03	.08
6. R-606 Tidiness	-.06	-.01	-.15	-.02
7. R-607 Culture	.02	-.03	.02	.18
8. R-608 Leadership	.11	-.06	-.07	.22
9. R-609 Self-Confidence	.04	.10	.03	-.04
10. R-610 Mature Personality	.05	.19	.36	-.09
11. F*701 Physical Science, Engineering, Math	.44	.22	.14	.31
12. F*702 Biological Science and Medicine	.15	-.02	.61	-.61
13. F*703 Public Service	.11	.05	.06	.01
14. F*704 Literary-Linguistic	.18	-.54	.14	.33
15. F*705 Social Service	.11	.28	.21	.08
16. F*706 Artistic	-.09	.23	-.13	-.04
17. F*707 Musical	-.07	-.20	.09	.01
18. F*708 Sports	.10	-.18	.07	-.04
19. F*709 Hunting and Fishing	-.15	-.32	-.07	-.12
20. F*710 Business Management	-.15	-.02	.01	.16
21. F*711 Sales	.20	.19	-.02	.25
22. F*712 Computation	.10	.05	-.08	-.03
23. F*713 Office Work	-.07	-.16	-.47	-.25
24. F*714 Mechanical-Technical	-.71	.22	-.14	.07
25. F*715 Skilled Trades	-.15	.22	-.17	-.24
26. F*716 Farming	.15	-.02	-.11	.08
27. F*717 Labor	-.05	-.35	.18	-.18
Per Cent of Trace	67.42	12.97	64.77	22.46

Table F-4

Scaled Discriminant Vectors Resulting from the Analysis of Six Post-High-School Education Groups Using SIB Items

		Discriminant Functions			
		Male Analysis		Female Analysis	
	Variable Name	I	II	I	II
1.	SIB-171 Rent paid each month	.28	-.31		
2.	SIB-172 Value of home if owned	.23	-.19	-.03	.25
3.	SIB-173 Family income	-.19	-.03	-.14	.15
4.	SIB-176 Books in home	.09	-.06	-.02	.03
5.	SIB-187 *Atlantic Monthly*, etc.	.16	-.10	-.10	.26
6.	SIB-188 *Reader's Digest*, etc.	.12	.36	.12	-.10
7.	SIB-190 Large appliances	.13	.10	.04	-.17
8.	SIB-191 TV, phone, radio, etc.	.04	.19	.05	-.43
9.	SIB-193 Musical instruments, etc.	-.00	.20	.07	.58
10.	SIB-194 Tennis racket, skis, etc.	.03	-.04	.06	.08
11.	SIB-195 Own room	.42	-.36	.29	-.05
12.	SIB-196 Hand tools in home	-.13	-.34	.16	-.04
13.	SIB-197 Power tools in home	-.31	-.27	-.37	.08
14.	SIB-198 Cars owned	-.12	-.50	-.01	.44
15.	SIB-206 Father's occupation	.38	.09	.40	-.02
16.	SIB-218 Father's education	.53	-.10	.53	-.23
17.	SIB-219 Mother's education			.51	.10
	Per Cent of Trace	69.18	12.54	76.31	13.42

Table F-5

Scaled Discriminant Vectors
Using Selected Predictors

	Males			Females	
	Function I	Function II		Function I	Function II
R-102	.17	-.03	R-104	.05	.14
R-105	-.12	.02	R-106	.33	.03
R-106	.35	.17	R-107	-.13	-.03
R-111	.05	.25	R-108	.17	-.00
R-112	-.02	-.10	R-114	-.04	-.13
R-114	-.12	-.00	R-139	-.12	.10
R-115	.12	-.17	R-212	.05	-.05
R-138	.08	.16	R-230	.12	-.04
R-139	-.13	-.35	R-240	.11	-.02
R-230	.19	-.22	R-250	.12	-.04
R-240	.24	-.17	R-282	-.14	-.03
R-250	.02	.19	R-340	.35	.11
R-270	-.12	.01	F-420	.15	-.04
R-282	-.02	.46	R-610	.12	-.07
R-340	.19	.03	F*701	-.06	.26
F-420	.02	.34	F*702	.50	-.79
F*701	.25	.12	F*704	-.02	.31
F*704	.18	-.21	F*705	.27	.11
F*711	.22	.03	F*713	-.43	-.06
F*714	-.58	.26	SIB-191	.08	-.09
SIB-172	.05	.09	SIB-193	-.05	.15
SIB-195	.14	.30	SIB-195	.09	.13
SIB-197	-.05	.06	SIB-197	-.05	-.07
SIB-198	.10	.20	SIB-198	-.05	.07
SIB-206	.15	-.08	SIB-206	.15	.14
SIB-218	.15	-.09	SIB-218	.15	.12
SIB-219	.28	.08	SIB-219	.19	.16
Per Cent of Trace	75.87	11.71	Per Cent of Trace	67.95	19.12

Appendix G

Career Plan Changes (Chapter 8)

Page

Occupations Included in Career Plan Categories G-2

Career Plan Changes

- Grade 9 G-4
- Grade 10 G-8
- Grade 11 G-12
- Grade 12 G-16

Table G-1

Occupations Included in Career Plan Categories Used in Chapter 8 and Appendix G

1. Mathematician - Mathematician
2. Physical scientist - Physicist, chemist, other physical scientists (astronomer, geologist, meteorologist, etc.)
3. Biological scientist - Biological scientist (includes pharmacologist)
4. Engineer - Engineer
5. Physician - Physician, surgeon
6. Dentist - Dentist
7. Nurse - Professional nurse
8. Pharmacist - Pharmacist
9. Psychologist, sociologist - Social scientist, psychologist, counseling, guidance (nonpsychologist)
10. Social worker - Social or welfare worker
11. Clergyman, etc. - Religion, theology
12. Government - Civil Service, foreign service, government official, Peace Corps., etc.
13. Lawyer - Lawyer, judge
14. Teacher, librarian - Teacher, librarian
15. Accountant - Accountant, auditor
16. Businessman - Business, industry
17. Writer - Author, editor, reporter
18. Artist, entertainer - Musician, artist, entertainer, performer, model
19. Engineering, scientific aide - Computer programmer, analyst, technician (science, engineering), surveyor, draftsman, electronic technician
20. Aviation - Aviation

21. Medical technician - Therapist (occupational, physical, etc.), technician (medical, X-ray, etc.)

22. Office worker - Tabulating operator, bookkeeper, stenographer, secretary, telephone operator, cashier, keypunch operator, typist, other clerical (clerk, office machine operator, etc.)

23. Salesman - Agent, broker, dealer, manager, salesman, sales clerk, other sales (routeman, door-to-door sales, collector, etc.)

24. Armed Forces - Armed Forces, Merchant Marines

25. Protective - Policeman, fireman, etc.

26. Skilled worker - Electrician, machinist, mechanic, repairman, railroad, clothing and fashion trades, printing

27. Structural worker - Carpenter, cabinetmaker, metal trades, painter, construction, maintenance, plumber, pipefitter, roadbuilding, earth-moving equipment operator, other building and construction, mining, quarrying, oil-drilling, other laborers

28. Housewife - Housewife

29. Barber, beautician - Barber, beautician

30. Farmer - Farm or ranch laborer, farm or ranch owner, manager

31. Not elsewhere classified - Architect, veterinarian, dietitian, home economist, other professional (applied social sciences, linquist, educational research), photography, recreation, sports, driver, outdoors (forestry, fishing, gardening, etc.), don't know, answer not usable, not available for job (excludes housewife), unemployed (excludes housewife), no answer, all other

Table G-2

Career Plan Changes

Grade 9 Males: Weighted Proportions (Based on Respondents and Nonrespondents)

		Follow-up Plans															
Grade 9 Plans	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Mathematician	12902	3	8		12	3	1			2				1	12	5	3
2. Physical scientist	30618	1	10	4	10	5	1		1	3		1	1	3	10	2	7
3. Biological scientist	18127	1	2	3	3	3	1		1	1		1		5	9	1	13
4. Engineer	143314	1	2	2	18	2			1	1		1		2	9	4	11
5. Physician	22543		1	5	3	23	2		1	7		1	1	3	9	7	9
6. Dentist	19329			1	7	3	14		1	1	4			4	10	2	16
7. Nurse	1052					2		3							6	2	1
8. Pharmacist	8064	1	2	1	3	3	2		8	1			1	2	6	6	9
9. Sociologist, psychologist	968			8	2	4				10		2		16	3	6	12
10. Social worker	5740				1							1			4	3	2
11. Clergyman, etc.	11287		2		2	1	1			2	1	22	1	4	20	2	5
12. Government	773					2				9		2	3	4	6	6	5
13. Lawyer	22386	1		1	4	2	1			2		1	1	16	13	3	14
14. Teacher, librarian	24105	1	1	1	3	1	1		1	2		1	1	2	23	6	8
15. Accountant	19584		4		12	4			1	1			4	1	5	12	10
16. Businessman	23256			1	2	1				1		1		2	10	8	32
17. Writer	2793				1	1				2	1	2	2	3	36		6
18. Artist, entertainer	12728			1	1					1		1		1	5	7	3
19. Engineering, sci. aide	9875	1	2	1	12	1			1	1			1	3	4	4	6
20. Aviation	23505		1	1	9	1				1		1		1	5	2	16
21. Medical technician	8569				14	5	1			1		1	1	1	5	2	10
22. Office worker	4779						1								3	5	17
23. Salesman	5348								1	1		1	1	1	2	2	7
24. Armed Forces	39266		1	2	4	1				3		1	1	2	6	2	14
25. Protective	9372			8	2					1	1			1	4	2	15
26. Skilled worker	36785				9	2									9	2	9
27. Structural worker	4699				2										2	3	8
28. Housewife	1390				4										4	3	3
29. Barber, beautician	3820			1					1						5	1	2
30. Farmer	36538			4	4	2									5	3	3
31. NEC	108459		1	1	4	1				1		1	2	2	7	4	11
All Students (weighted)	671,974	1	2	2	8	2	1	0	0	1	0	1	1	2	9	4	11

Table G-2 (cont.)

Career Plan Changes

Grade 9 Males: Weighted Proportions (Based on Respondents and Nonrespondents)

Grade 9 Plans	Follow-up Plans 17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Row Total
1. Mathematician		1	3			7	7	7	1	9	6		1		8	100
2. Physical scientist	1	2	4			5	3	7		2	3				14	100
3. Biological scientist		2	6		5	1	1	1		2	1		1	1	35	100
4. Engineer		2	4			1	1	3	1	9	4		1	1	19	100
5. Physician	3	1	2	3	4	4	1	1	1	1					7	100
6. Dentist		1	5		3	1	1	1		2	7		5	1	10	100
7. Nurse			3	3						65	4				11	100
8. Pharmacist	1	2	3			1	2	7		11	2			1	25	100
9. Sociologist, psychologist		6	3		2		2	5		4			1	2	12	100
10. Social worker	1		2			1				26	20		13		26	100
11. Clergyman, etc.		1	2					1	12	2	1			1	17	100
12. Government										11	4		31		17	100
13. Lawyer	1	5	2			3	1	1	1	7	5		3		12	100
14. Teacher, librarian		2	9		1	1	1	4	1	7	5		1	1	15	100
15. Accountant		1	2			2	4	1	1	5	5			1	24	100
16. Businessman		1	4		1	5	3		1	2	1		8		16	100
17. Writer	6	2	23							4				1	10	100
18. Artist, entertainer		14	6			1	1	2		8	6		1		41	100
19. Engineering, sci. aide		1	4			2	8	2	1	4		7			34	100
20. Aviation	1	1	9	3		4	1	10	1	5	2			4	21	100
21. Medical technician		1	1		1		1	1	1	1			1		51	100
22. Office worker		1	2	13		4	1	1		2	14	2			34	100
23. Salesman		2	1				5	1		2	3			1	69	100
24. Armed Forces	1	1	6	1		1	1	3	3	11	9		2	1	23	100
25. Protective		2	3			2	1	8	8	14	4		7	1	16	100
26. Skilled worker			6			4	1	1	1	21	8			2	25	100
27. Structural worker		1	4			1		1	1	15	8		2	16	36	100
28. Housewife		2	3			5		3	2	3	5	3		52	8	100
29. Barber, beautician		3	2			2				5	19		6	48	5	100
30. Farmer		1	5			1	1	1		13	9			20	28	100
31. NEC		3	3		1	2	2	4	1	11	6		3	1	28	100
All Students (weighted proportions)	0	2	4	0	1	2	2	3	1	9	5	0	2	2	22	100

Table G-3

Career Plan Changes

Grade 9 Females: Weighted Proportions (Based on Respondents and Nonrespondents)

		Follow-up Plans															
Grade 9 Plans	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Mathematician	7606	2	1	1		1		1		2	1	1	1		34	3	2
2. Physical scientist	7206	2	4	2		1		3	1	3	2	1		1	32	1	3
3. Biological scientist	11383	1	1	2		1		3		2	1				15		1
4. Engineer	4627				2			1		1	1				11	1	
5. Physician	10322			1		6		14		3	2		1		22		3
6. Dentist	2011		1			1		2			1				17		1
7. Nurse	106877						1	19			2				13		3
8. Pharmacist	7664							11	2		1				8	1	
9. Sociologist, psychol.	6949	1						2		7	4		2		28	1	2
10. Social worker	11083							3		2	7	1			21		2
11. Clergyman, etc.	2765			1				5		1	2	43		1	16		
12. Government	459									4			3	3	27		5
13. Lawyer	8697		1					2		2	2		2	3	17	1	3
14. Teacher, librarian	115819							3		1	2	1			51	1	1
15. Accountant	8682	1						2				1			7	3	3
16. Businessman	3532							2	1					1	11	2	2
17. Writer	6674		6	1				1		2	2		1		18		13
18. Artist, entertainer	26086							1		1	1		1	3	12		2
19. Engineering, sci. aide	968							2							6	2	77
20. Aviation	2914							27		1	2	1		2	9	1	2
21. Medical technician	7290	1		1		1		12	2	3	2	1			19	1	1
22. Office worker	178079							2		1	1				10	1	4
23. Salesman	2500					2							1		6	1	1
24. Armed Forces	6091		1					5		1	1				8		1
25. Protective	636					3		3		2	3				2		3
26. Skilled worker	346							6							19	6	
27. Structural worker	670										3	3			1		
28. Housewife	82426							2		1	1	1			13		3
29. Barber, beautician	29434							3							3		1
30. Farmer	1460	2						4		1			3		11		1
31. NEC	71830		1					3		1	1	2	1		15		4
All Students (weighted)	733,086	0	0	0	0	0	0	5	0	1	1	1	0	0	18	1	3

Table G-3 (cont.)

Career Plan Changes

Grade 9 Females: Weighted Proportions (Based on Respondents and Nonrespondents)

	Follow-up Plans															
Grade 9 Plans	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Row Total
1. Mathematician	1	1	2		2	13					1	7	1		22	100
2. Physical scientist	2	4	3		6	10	1					7	3		8	100
3. Biological scientist	1	2	1		8	25						14	9		12	100
4. Engineer	1	2	1		2	4						34	1		38	100
5. Physician	1	3	1		11	7				1		11	6		7	100
6. Dentist		1			11	7				1	1	12	4		40	100
7. Nurse		1	1		3	14				1	1	25	10		6	100
8. Pharmacist			1		1	32				10		26	4		3	100
9. Sociologist, psychol.	2	1			22	15						4	1		8	100
10. Social worker		2			3	19	1					11	10		18	100
11. Clergyman, etc.	1	1			3	5		1			1	13	2		4	100
12. Government	5					12	5					21	5		10	100
13. Lawyer	3	9			2	7	1			1		29	3		12	100
14. Teacher, librarian	1	1			2	14						13	4		5	100
15. Accountant	1					45						19	5		13	100
16. Businessman	1	1		1		36						17	20		5	100
17. Writer	4	2			1	8						31	3		7	100
18. Artist, entertainer	1	16			1	19	1			1		33	3		4	100
19. Engineering, sci. aide		2				3	2					2	4			100
20. Aviation	1	2			2	19	1	1		1		14	10		4	100
21. Medical technician	1	1	1		10	18						16	4		5	100
22. Office worker		1			3	31	1				1	29	6		9	100
23. Salesman		1	1		1	10	1			1		64	6		4	100
24. Armed Forces	1	1			1	17	1	1		1		35	18		7	100
25. Protective					6	25			2			27	17		7	100
26. Skilled worker						29	6					18	16			100
27. Structural worker	2	5			5	3						69	3		6	100
28. Housewife	2	1			1	14	1			1	1	42	6		10	100
29. Barber, beautician		1			1	20						36	25		10	100
30. Farmer		2	11		2	20				1	2	17	6		17	100
31. NEC	2	5			3	15	1			3		27	8		7	100
All Students (weighted proportions)	1	2	0	0	3	20	1	0	0	1	1	26	7	0	8	100

Table G-4

Career Plan Changes

Grade 10 Males: Weighted Proportions (Based on Respondents and Nonrespondents)

Grade 10 Plans	N	Follow-up Plans 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Mathematician	10172	4	3		14	2			1	2			1	2	7	5	5
2. Physical scientist	23590	1	13	2	9	4	1		1	3		1	1	5	10	2	6
3. Biological scientist	21537	5	2	9	3	3			1	2		1	3	1	11	2	4
4. Engineer	125384	1	2	1	18	2	1			1	1	1		2	5	6	9
5. Physician	19455	1	2	1	2	41	2		5	4		2	1	5	8	4	8
6. Dentist	15121		1		4	4	9		1	2				7	7	3	5
7. Nurse	1166			2	2	2		2				3			6	2	2
8. Pharmacist	13791			1	1	4	2		15	1		1	1	2	8	6	19
9. Sociologist, psychol.	2508		2		2	6			1	9		1	1	6	8		3
10. Social worker	5896				1					1		1		1	3	1	25
11. Clergyman, etc.	13107	1	1		1	1			7	2	3	26		2	15	2	2
12. Government	1714		1		1					4		1	5	5	6	1	3
13. Lawyer	24219	1	1		1	2	1			4		3	2	23	10	5	5
14. Teacher, librarian	32201		1	1	1	2				4		3	1	1	29	3	11
15. Accountant	18932	1			4				1	1		1	1	1	6	17	8
16. Businessman	24521				3	1					1	1	1	3	8	9	22
17. Writer	2673					2				5			1	4	9	3	20
18. Artist, entertainer	16372		1		1					1		1	3	1	4	1	5
19. Engineering, sci. aide	7074	1	2		15	1			7			1	1	1	5	4	5
20. Aviation	22883		1	1	5		1			1		4	1	2	6	3	7
21. Medical technician	2320	1	1	3	2	13	11			1		1		2	10	5	8
22. Office worker	3366							1	1				1		5	3	2
23. Salesman	5317									1				2	21	5	19
24. Armed Forces	54605		1	1	4								2	1	6	1	11
25. Protective	13920		3		1								1	1	8	1	7
26. Skilled worker	42208				6		1			2		1	1		5	1	6
27. Structural worker	8138			1	10	10									3	1	5
28. Housewife	381														18		5
29. Barber, beautician	3871			1	1	1							1		4	1	15
30. Farmer	34680		1	4	4									1	3	1	3
31. NEC	104584		1	2	3	1	1		1	1		1		1	7	2	10
All Students (weighted)	675,706	1	1	1	6	2	1	0	1	1	0	2	1	3	8	4	9

Table G-4 (cont.)

Career Plan Changes

Grade 10 Males: Weighted Proportions (Based on Respondents and Nonrespondents)

Grade 10 Plans	Follow-up Plans 17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Row Total
1. Mathematician	1	2	3			2	4	1		3	1		9	2	26	100
2. Physical scientist	1	3	7	1	1		2	1		1	3			1	20	100
3. Biological scientist	1		7		1	1	3	3	1	9	6			1	20	100
4. Engineer		1	7	2	1	2	3	2	1	7	6			1	17	100
5. Physician		1	1		1					1				2	8	100
6. Dentist		1	10	1			4	1	9	11	1				19	100
7. Nurse			35		21	2		4		4		3	2		8	100
8. Pharmacist		4	2		1	1	6		1	13	4				7	100
9. Sociologist, psychol.		4	29		1		2							2	23	100
10. Social worker		1	16			8	1	15		9	3			1	13	100
11. Clergyman, etc.	1	8	1		1	1		12	1	4					8	100
12. Government	14	1	16			2	2	1			1		3	1	32	100
13. Lawyer	1	1	4	2		2	1	1	4	2	4		1	1	18	100
14. Teacher, librarian	1	1	2		3	2	3	1	1	5	4		3	1	16	100
15. Accountant		4	2			1	4	1	1	11	1		4	5	25	100
16. Businessman		1	4			2	12			6	4		1		21	100
17. Writer	9	1					1			2	1		6		36	100
18. Artist, entertainer		38	5			7	1	6		1			5	5	14	100
19. Engineering, sci. aide		1	10			7	1	1		23	7				7	100
20. Aviation		1	5	3		1	4	6	3	9	7			4	25	100
21. Medical technician	1				4	3	4				1		1		28	100
22. Office worker		1	1			4		1	1	13	1	1	38		26	100
23. Salesman	25	1	2			1	12			2	3		1	1	4	100
24. Armed Forces	1	3	7		1	2	1	6	1	13	7		3	1	27	100
25. Protective		1	5			1	7	7	12	24	5		1		15	100
26. Skilled worker		4	7			1	3	3	2	25	11		2	1	18	100
27. Structural worker			3			1	1	1		12	31		5	1	15	100
28. Housewife			6			6				19	6	3		6	31	100
29. Barber, beautician		1	1	2		2	1	12	11	6	8		12	1	19	100
30. Farmer		1	1		3	2	1	3	1	17	11		1	21	21	100
31. NEC		2	6			2	3	4	1	13	10		1	2	25	100
All Students (weighted proportions)	1	3	5	1	1	2	3	3	2	10	6	0	2	3	17	100

Table G-5

Career Plan Changes

Grade 10 Females: Weighted Proportions (Based on Respondents and Nonrespondents)

Grade 10 Plans	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Follow-up Plans															
1. Mathematics	6895	3	2	1	1			2		1	1		1		29	2	2
2. Physical scientist	6933	2	3	2		2		6		2	1	1	1	1	17	1	1
3. Biological scientist	9134		1	4		1		4		3	2		1	1	17		7
4. Engineer	3972	12	2		1	1				2	1				25	11	11
5. Physician	7629			2		5		8		3	3	1		1	16	1	10
6. Dentist	2257	3				3	1	4			1		1		14	1	2
7. Nurse	85632				1			23				1			9	1	2
8. Pharmacist	5595		1					11	3		1	1			10	1	
9. Sociologist, psychol.	8422					2		3		7	9	1	2		28	1	2
10. Social worker	19742							4		4	6	1			22		1
11. Clergyman, etc.	2436					1		9		3	2	9			14	1	
12. Government	785							4		14	3		5		26		
13. Lawyer	4911	1		1				10		3	2		1	5	21		2
14. Teacher, librarian	105608	1						3		1	2		1		48	1	1
15. Accountant	12666							1			1				4	3	2
16. Businessman	3212							1			1				7	2	5
17. Writer	5845		1							1	9		1		26	1	3
18. Artist, entertainer	21223							1		1	4				20		1
19. Engineering, sci. aide	248	8								9					45		16
20. Aviation	3547							14	1	1	1	1	1		7	2	2
21. Medical technician	10341			1				8		1	2				24		4
22. Office worker	174753							2			1				8	1	2
23. Salesman	2666							1		9					5		2
24. Armed Forces	8146							6							5		2
25. Protective	636														6		4
26. Skilled worker	298	8													19		
27. Structural worker	180														12		
28. Housewife	79684					1		4			1		1		10		2
29. Barber, beautician	29608							5							5		1
30. Farmer	3013							1				1	1		2		29
31. NEC	68430							3		1	1	1	1		18		2
All Students (weighted)	694,447	0	0	0	0	0	0	6	0	1	1	0	0	0	17	1	2

Table G-5 (cont.)

Career Plan Changes

Grade 10 Females: Weighted Proportions (Based on Respondents and Nonrespondents)

Grade 10 Plans	Follow-up Plans 17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Row Total
1. Mathematician		1	2		3	6	1					12	8		22	100
2. Physical scientist	8	1	1		4	4						33	6		3	100
3. Biological scientist	1	2	1		4	6	1	1				29	3		11	100
4. Engineer	2	2	1		1	15				1		8	1		3	100
5. Physician	1	2	1		4	15	1					16	1		9	100
6. Dentist		1	1		9	11						44	2		2	100
7. Nurse			1		3	16	1				1	27	10		4	100
8. Pharmacist		1			4	19	1					35	2	8	2	100
9. Sociologist, psychol.	1	1	1		2	9	1			1		22	1		6	100
10. Social worker	1	3			4	13				2		25	6		8	100
11. Clergyman, etc.					3	25					1	10	2		20	100
12. Government		6			2	32						5	3			100
13. Lawyer	2	10			2	17						8	12		3	100
14. Teacher, librarian	1	1			1	16						14	5		4	100
15. Accountant		1			6	35	1					30	10		6	100
16. Businessman	1					46	1					26	4		6	100
17. Writer	17	1			2	14						12	1		11	100
18. Artist, entertainer	1	16			2	12	1			1		22	7		12	100
19. Engineering, sci. aide						9						13				100
20. Aviation		1	1	1	2	10	1					28	7		19	100
21. Medical technician	1	2			15	8	1			4	4	16	2		7	100
22. Office worker		1			1	38	2				1	31	5		7	100
23. Salesman		1				58	3			1		16			4	100
24. Armed Forces		1				16	1	1			1	50	14		3	100
25. Protective		15				30			3			15	14		13	100
26. Skilled worker		4			7	22				19		13	8			100
27. Structural worker		12				43						22			11	100
28. Housewife		2			1	13				1	1	50	5		8	100
29. Barber, beautician		1			1	19	2		2		1	35	21		7	100
30. Farmer		1				6			1	1		20	3	2	32	100
31. NEC	1	4			2	17	2			1	1	31	6		8	100
All Students (weighted proportions)	1	2	0	0	2	21	1	0	0	0	1	31	6	0	7	100

Table G-6

Career Plan Changes

Grade 11 Males: Weighted Proportions (Based on Respondents and Nonrespondents)

		Follow-up Plans															
Grade 11 Plans	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Mathematician	15086	11	3		12		1					1		1	13	5	11
2. Physical scientist	23230	1	26	4	10	4	1		1	2		2	3	1	6	1	6
3. Biological scientist	15586		5	13	6	8	1		3	1				1	18	1	9
4. Engineer	141534	1	2	1	24	1	1			1		1		2	6	3	8
5. Physician	22915	1	1	1	2	36	4		2	2		1		6	8	5	4
6. Dentist	15347			3	3	5	23		1					2	14	2	6
7. Nurse	1848			1				3	1			1			60	1	
8. Pharmacist	12079		1	1	1	5	3		13	1		1		5	8	2	10
9. Sociologist, psychol.	3186	1			2	8	2		1	13	3		4	1	7	1	5
10. Social worker	3915					1				1	3			13	4	1	2
11. Clergyman, etc.	11278		1		4	2				6		50		2	7	1	2
12. Government	1969	1		2		3	1		1	2		1	3	9	9	4	24
13. Lawyer	22656				3	1				4		1	1	34	6	6	10
14. Teacher, librarian	40555	1	1	1	2	1	1			4		3		1	41	4	5
15. Accountant	26088	1	3		2					1		3		3	3	35	10
16. Businessman	38210			1	3	2				1				4	4	7	26
17. Writer	5491				1	1				10	1	8	1	1	5		7
18. Artist, entertainer	15773			1	1	1				1		1			12	1	5
19. Engineering, sci. aide	10749		1		48							1			10	2	4
20. Aviation	17774		3		7	1				1		1		1	2	1	9
21. Medical technician	3465	1	1		1	10	1	1		1		1			17	2	2
22. Office worker	4010				1	1							1		7	5	2
23. Salesman	6639				1										1	2	18
24. Armed Forces	62114		1	2	4								1	1	6	4	6
25. Protective	13567			4	2	1						3		1	2	3	6
26. Skilled worker	54338		1		5		1								2	2	4
27. Structural worker	8882				1										2	1	7
28. Housewife	1730				1		1								2	1	1
29. Barber, beautician	5373				1										2		2
30. Farmer	30611			2	1							2			8		5
31. NEC	119953		1	2	3					1		1	1	1	5	2	8
All Students (weighted)	755,951	0	2	1	8	2	1	0	0	1	0	2	1	3	8	4	8

Table G-6 (cont.)

Career Plan Changes

Grade 11 Males: Weighted Proportions (Based on Respondents and Nonrespondents)

Grade 11 Plans	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Row Total
	Follow-up Plans															
1. Mathematician		1	7	5		1	8	1		1	1			4	13	100
2. Physical scientist		3	4			2	2	2		3	1				15	100
3. Biological scientist		1	4		1	3		3		1					21	100
4. Engineer		1	7			1	3	4	1	8	4		1	2	17	100
5. Physician		3			3			5	1	1					14	100
6. Dentist							3	4	5	7	6				16	100
7. Nurse		1		1					1	2			2		26	100
8. Pharmacist		3	1			3	5	4	1	1	2		3	6	20	100
9. Sociologist, psychol.	1	2			14	1	2	16	1	5					10	100
10. Social worker		1	2	1		1	1	1	12	9	12		3	1	31	100
11. Clergyman, etc.	2	3	3			1		1		1					14	100
12. Government	1		1				1								37	100
13. Lawyer	3	1	2			2	3	3	1	4	1				14	100
14. Teacher, librarian		2	3			1	1	1	1	2	5	1		1	17	100
15. Accountant		1	1			7	2	1	1	4	6		2	2	12	100
16. Businessman		1	3		1	3	9	2	3	2	3		2	1	22	100
17. Writer	10	18					1		1					19	16	100
18. Artist, entertainer	1	46	2			1	3			1	3		3		17	100
19. Engineering, sci. aide		1	3			1		1		10	5			1	12	100
20. Aviation		1	4	4		2	1	11	3	14	11		3		20	100
21. Medical technician		1	2		4	13	1			3			1		37	100
22. Office worker		1	2	11		18	1	1		8	11	1	1		28	100
23. Salesman			9			1	10		4	2	7		1		44	100
24. Armed Forces		2	4	1		3	1	13	3	12	6		3	1	26	100
25. Protective			1		1	6	2	4	15	8	8		2	1	30	100
26. Skilled worker		3	9	1		3	1	4	1	28	13		1	1	20	100
27. Structural worker		6	3			1	1	1	1	13	15		6	1	41	100
28. Housewife		26	31				2			3	25	1		1	5	100
29. Barber, beautician		1	17			1	7	2		13	17		22		15	100
30. Farmer			1			1	2	2	1	11	9		1	35	19	100
31. NEC		3	5			5	4	4	2	13	7		2	2	28	100
All Students (weighted proportions)	0	3	4	0	0	3	3	4	2	9	6	0	1	3	21	100

Table G-7

Career Plan Changes

Grade 11 Females: Weighted Proportions (Based on Respondents and Nonrespondents)

		Follow-up Plans															
Grade 11 Plans	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Mathematician	5082	15	2	1	1			2		2		1			34	3	1
2. Physical scientist	4806	2	9	3		2		2		4	1	1	1	1	34	1	
3. Biological scientist	9528			4		2		7		1	1		1		28		1
4. Engineer	1573	3	1	1	8			4				1			21	1	
5. Physician	8922		1	1		19		11		1	1	1	1		15		1
6. Dentist	2736	1	1	1		1		1		1					22		1
7. Nurse	95379							40			1				9		1
8. Pharmacist	3482		1	1		1		3	10	1	1	1			20		1
9. Sociologist, psychol.	10607	7		1		1		4		19	6	1	3		22		1
10. Social worker	20274							4		4	8	2	1		21		7
11. Clergyman, etc.	2074							18		2	2	18			18	1	
12. Government	1749									1			7	1	18	1	
13. Lawyer	7645							1		10				6	29	13	2
14. Teacher, librarian	125964							1		1	1	1			58		3
15. Accountant	18140	2						4			1				6	3	1
16. Businessman	5852							1		1					17	1	11
17. Writer	6650							1		1	3		1		26		2
18. Artist, entertainer	21607							1					1		19		1
19. Engineering, sci. aide	247		9					9							42		8
20. Aviation	3132							3		1	1				8	1	2
21. Medical technician	13533	1	1	1		1		13		1	1				25		1
22. Office worker	206477							2							6	1	2
23. Salesman	5049							1							13		
24. Armed Forces	8744		1			1		2			5	1			7		1
25. Protective	1251							3			21				2		3
26. Skilled worker	401														11		
27. Structural worker	155		14					17							14		
28. Housewife	100260							2							11	1	1
29. Barber, beautician	33102							1							2		1
30. Farmer	1859		1	24						1					6	1	1
31. NEC	71496			1				3		1	1	1	2		15	1	2
All Students (weighted)	797,776	0	0	0	0	0	0	7	0	1	1	0	0	0	18	1	2

Table G-7 (cont.)

Career Plan Changes

Grade 11 Females: Weighted Proportions (Based on Respondents and Nonrespondents)

Grade 11 Plans	Follow-up Plans 17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Row Total
1. Mathematician			1		2	5	1					24	1		4	100
2. Physical scientist	1	1	1		7	5						6	9		9	100
3. Biological scientist	1	6	1		9	2						8	6		22	100
4. Engineer		5	4		1	3				1		39			7	100
5. Physician	8	1			3	3						18	5		10	100
6. Dentist		1			9	9	1				1	47	2		1	100
7. Nurse					5	12				1	1	17	8		5	100
8. Pharmacist		2			5	40				1		6	2		4	100
9. Sociologist, psychol.	1	1			6	4	1					12	1		9	100
10. Social worker	1	1			1	11	1					25	7		6	100
11. Clergyman, etc.	2	2			4	9						20			4	100
12. Government		2			2	3		1		1		4	5		54	100
13. Lawyer	1	1			8	11				1		13	1		3	100
14. Teacher, librarian		1			2	12	1				1	10	3		5	100
15. Accountant		1				36	1				1	31	7		8	100
16. Businessman		1				43	2			1		12	1		10	100
17. Writer	19	8				17	1					7	1		13	100
18. Artist, entertainer	1	29	4		1	12	1			1	2	9	8		9	100
19. Engineering, sci. aide										5		8	11		8	100
20. Aviation		2			2	27	1					26	22		4	100
21. Medical technician		1			16	11						18	2		7	100
22. Office worker		1			1	48	1			2		28	4		4	100
23. Salesman			1			11	11					36	2		25	100
24. Armed Forces		2			1	19		2		5		33	15		5	100
25. Protective						13			4			41	4		9	100
26. Skilled worker						65						16			8	100
27. Structural worker		14				17						24				100
28. Housewife	1	2			1	18	2			1	1	43	5		11	100
29. Barber, beautician		1			1	25					2	28	34	1	4	100
30. Farmer	2	6				16				1	1	36		1	3	100
31. NEC	2	6			2	16	2			2		21	10		12	100
All Students (weighted proportions)	1	2	0	0	2	24	1	0	0	1	1	25	6	0	7	100

Table G-8

Career Plan Changes

Grade 12 Males: Weighted Proportions (Based on Respondents and Nonrespondents)

Grade 12 Plans	N	Follow-up Plans 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Mathematician	6373	18	3	2	6	1						1			14	10	5
2. Physical scientist	17343	2	27	2	10	5			1	2		1		2	5	1	4
3. Biological scientist	8095		4	14	2	4	1		1	2		2	1	2	10	1	5
4. Engineer	99714	1	3	2	36	1				1				2	4	3	7
5. Physician	14225		1	1	1	59	2		1	1		1	1	5	3		6
6. Dentist	10388				12	5	34			4				5	7	1	3
7. Nurse	1461				3		1	6									4
8. Pharmacist	9114		1	5	2	3			36	1		1		1	5	2	7
9. Sociologist, psychol.	4864		1		1	5	9		1	15		1		4	9	7	7
10. Social worker	3207				1					3	6	2	1		18	1	9
11. Clergyman, etc.	8741	1			4	6				1	1	65		1	6	1	1
12. Government	3068			2	1	1				6		2	11	8	12		5
13. Lawyer	19470			3	1	4				1			2	36	6	3	10
14. Teacher, librarian	43171		4	1	1					1		3	2	1	49	1	3
15. Accountant	27650				2					1		1	1	2	10	30	14
16. Businessman	44870				4	1				2			1	3	4	8	27
17. Writer	4801					1				2		3	1	2	16	1	3
18. Artist, entertainer	9349			1	1	1				1		1		1	7	1	4
19. Engineering, sci. aide	5996	1	1	1	18				1			1			5	6	11
20. Aviation	10978				8	1	3		1				1	1	2		3
21. Medical technician	1641			4	3	22	2		4			2		1	8	1	7
22. Office worker	2988				16	1									2	5	6
23. Salesman	8340				1							5	1	1	6	7	15
24. Armed Forces	34896		1	1	5								1	1	3	2	7
25. Protective	8871				1								1	1	2	1	8
26. Skilled worker	43739				4								1		2	2	4
27. Structural worker	7928				1										2	1	2
28. Housewife	2561																
29. Barber, beautician	5283				1										1	1	2
30. Farmer	25047			5	1										1		3
31. NEC	83556		1	2	3	1				1		1	1	1	6	3	7
All Students (weighted)	577,728	0	2	1	9	3	1	0	1	1	0	2	1	3	8	4	8

Table G-8 (cont.)

Career Plan Changes

Grade 12 Males: Weighted Proportions (Based on Respondents and Nonrespondents)

Grade 12 Plans	Follow-up Plans 17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Row Total
1. Mathematician	2		4			1	1	1		2	1			3	25	100
2. Physical scientist		1	4	1	1	1	1	4		1	1		7	1	15	100
3. Biological scientist		1	1		2	9		1		3	1			14	19	100
4. Engineer		1	6			1	1	2		8	3			2	16	100
5. Physician		1			1			3		1			3		9	100
6. Dentist		4	1		1	1	1			1	5			2	13	100
7. Nurse		1	2	2	2	3					3		65		8	100
8. Pharmacist		1	5			5	1			6	2	4			12	100
9. Sociologist, psychol.	1	2	1		1	7	1	8		1	1				17	100
10. Social worker	1	1	2		9	3	1	2		6	3				31	100
11. Clergyman	1	1	1			1		1		1	1				6	100
12. Government	1	2	1				2	1	1	3				1	40	100
13. Lawyer	1	1	5			3	3	2	1	1	3				14	100
14. Teacher, librarian		2	2			2	2	2	1	4	4		1	3	11	100
15. Accountant			1			7	1	2	1	2	1		2		22	100
16. Businessman		1	1	2		3	6	3	1	3	1		1	1	27	100
17. Writer	48	2				2				1					18	100
18. Artist, entertainer	1	37	11		1	1		6		2	7		1		15	100
19. Engineering, sci. aide		1	9		1	1	1	1		22	1		1		17	100
20. Aviation		1	7	8	4	1	1	6	1	8	2		5	1	35	100
21. Medical technician	1	2	1		23	1		1	4		1				12	100
22. Office worker	1	1	1			10	1		1	15	14	15	1		10	100
23. Salesman			1			1	23	5		6	10		1		17	100
24. Armed Forces		2	8	2		5	4	12	1	11	8		2		24	100
25. Protective		1	1			7	9	4	23	12	3			1	25	100
26. Skilled worker		1	8			4	1	2	3	34	10		1	1	22	100
27. Structural worker		2	8			12	1	1	1	4	30		1	2	32	100
28. Housewife						1	1			1	1	18		3	75	100
29. Barber, beautician				1	1	10	2	8	8	1	18	9	22	1	14	100
30. Farmer		1	4				1	2	1	3	5		5	45	23	100
31. NEC	1	4	6	1	1	5	2	1	1	10	9		2	3	27	100
All Students (weighted proportions)	1	2	4	1	1	3	2	3	1	8	5	0	2	3	20	100

Table G-9

Career Plan Changes

Grade 12 Females: Weighted Proportions (Based on Respondents and Nonrespondents)

		Follow-up Plans															
Grade 12 Plans	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Mathematician	4183	17	2	2	1			1		1	1	10	1		26	2	1
2. Physical scientist	4425	1	21	6	1	1		2	1	2	1	1	2		13	1	1
3. Biological scientist	3184		3	12		3		3	1	1	3	1	1		28		
4. Engineer	1340	5	2		20	2		2		1	2				22	3	5
5. Physician	4325		2	1		27		6	2		1	1	1	1	16	1	1
6. Dentist	1301						3	2	3				2		7	1	
7. Nurse	68419							46			1	1			6	1	
8. Pharmacist	3342	1		12				1	16	1	1	13	1		16		1
9. Sociologist, psychol.	10374					1		2		16	11	1	1		21		6
10. Social worker	15364							5		2	16	3	1		17		1
11. Clergyman, etc.	1183					2		7			7	32			22		2
12. Government	1207									2			36		26		2
13. Lawyer	1931							1		4	6		4	25	19	1	1
14. Teacher, librarian	107696							1		1	1	2			64		1
15. Accountant	17088							1							8	10	3
16. Businessman	2686									1			2		4	1	8
17. Writer	6706										1		1	1	18		8
18. Artist, entertainer	17167							1			1				13		4
19. Engineering, sci. aide	465				55							4		5	5		
20. Aviation	3510							2			1		1	1	2		1
21. Medical technician	14156		1	1		1		6			1	1			10	1	1
22. Office worker	204491							1							4		2
23. Salesman	5274							3		1					2		2
24. Armed Forces	2960							7			2	1	1		4	1	2
25. Protective	495							4			8			2	11	4	4
26. Skilled worker	626							4							6		
27. Structural worker	102														22		
28. Housewife	64882				1			2							7		1
29. Barber, beautician	27180							1							1		1
30. Farmer	1197			1											15	2	
31. NEC	73194							2		1	1	1	1		12		2
All Students (weighted)	670,453	0	0	0	0	0	0	6	0	1	1	1	0	0	16	1	2

Table G-9 (cont.)

Career Plan Changes

Grade 12 Females: Weighted Proportions (Based on Respondents and Nonrespondents)

Grade 12 Plans	Follow-up Plans															Row
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
1. Mathematician		1	4		1	15				1		5	1		7	100
2. Physical scientist	1	1	12		5	8						13	1		5	100
3. Biological scientist	2	2	1		14	5		1		1		7	1		10	100
4. Engineer			4		3	2		2		1		10	2		12	100
5. Physician	1				8	22	1					3			5	100
6. Dentist		3	2		32	24						11	5		5	100
7. Nurse					2	13						17	9		4	100
8. Pharmacist	1	1			3	19	1					8	1		3	100
9. Sociologist, psychol.	1	1			5	4	1					10	1		18	100
10. Social worker	1	3			4	19	1					18	3		6	100
11. Clergyman, etc.	2					2						16	4		4	100
12. Government		2				2	2			2		6	2		18	100
13. Lawyer	1	1				12	1		1			10			13	100
14. Teacher, librarian		1			1	8					1	12	1		6	100
15. Accountant		1			1	36				1		29	3		7	100
16. Businessman	10	4	1		1	42	4	1			1	16	1		3	100
17. Writer	18	1			2	10						5	1		34	100
18. Artist, entertainer		42			1	9				3		14	4		8	100
19. Engineering, sci. aide		3	9			16						3				100
20. Aviation				1	1	12	1				1	45	28		3	100
21. Medical technician		1			35	19						17	2		3	100
22. Office worker		1				46	1				1	35	2		7	100
23. Salesman		1				10	14			1	2	37	12		15	100
24. Armed Forces	1	4	1		1	20	1	18		1	2	20	4		9	100
25. Protective						32			16			11	4		4	100
26. Skilled worker						29				3	3	46	7		2	100
27. Structural worker			20					20				38				100
28. Housewife		2			1	11	2			1	1	59	3		9	100
29. Barber, beautician						13	5				2	27	41		9	100
30. Farmer		2				9		38		2		17	2	7	5	100
31. NEC	1	5			4	20	2	1		1	1	25	8		12	100
All Students (weighted proportions)	1	2	0	0	2	23	1	0	0	0	1	29	5	0	8	100

Appendix H

Data Bank Research Utilizing One-Year Follow-up Data

Lyle F. Schoenfeldt and Ronya J. Sallade

In the belief that the data collected in conjunction with Project TALENT are the property of the entire academic community, the Project TALENT Data Bank was established. Through this arrangement, all Project TALENT data as well as computer programs for their analysis are available to interested researchers.

To enter the system, the outside researcher first defines a problem of interest to him. Once he has determined his objectives, he drafts specifications outlining the precise data to be used as well as the method of analysis. In certain instances, he may wish to obtain raw data (student identifying information deleted, of course) and utilize local computer resources for their analysis.

The Project TALENT Data Bank Coordinator receives these specifications and serves as liaison between the researcher and all Project TALENT staff. Working with both parties, he is in a position to recommend revisions that seem appropriate, prepare final specifications, and coordinate all phases of the data analysis.

Using this system, 19 Data Bank projects have been undertaken during the past two years, four of which have made use of the one-year follow-up data. Since all four projects are presently underway, definitive results are not yet available. However, major aspects concerning the design of each project are described in the paragraphs that follow.

The American Medical Association and the National Science Foundation are employing the "follow-back" procedure, potentially one of the most powerful applications of the Project TALENT data. This method takes advantage of the fact that Project TALENT has extensive test data on approximately 5 per cent of the United States population born between the years 1942 and 1946. The AMA provided each medical school in the United States with a list of the approximately 1,300 high schools participating in Project TALENT in 1960. The medical schools were asked to provide names of medical students who had been enrolled in these high schools during that year. Using these names Project TALENT was able to determine which students were in fact tested in 1960 and to pull from computer tape files all test information available for them. Since Project TALENT collected a great deal of information concerning career plans, it will be possible for the AMA to study the characteristics of students who planned medical careers and who did or did not reach medical school. In addition, the AMA plans to identify a sample of Project TALENT students who have aptitudes, abilities, and interests very similar to those of students presently enrolled in medical school. Using the Project TALENT follow-up data, they will be able to determine what careers these individuals are presently pursuing.

The National Science Foundation plans to provide names of students who participated in their Summer Institutes Program while attending a high school which participated in Project TALENT. Using the data gathered in the Project TALENT one-year follow-up surveys, NFS will be able to determine the career plans these students are presently pursuing, and they will be interested in selecting from the Project TALENT files a sample of students who have aptitudes, abilities, and interests similar to those of the students who participated in the National Science Foundation's Summer Program. By determining what proportion of the matched sample are presently pursuing science careers, it will be possible to obtain one type of evaluation of the effect the Summer Institute Program has on eventual career plans.

The Commission on Human Resources and Advanced Education in Washington, D. C. has two Data Bank projects in progress which make use of the follow-up data. The first study involves the comparison of mean verbal and quantitative scores, plus other variables such as follow-up career plans, among colleges represented by students in the Project TALENT sample. These scores of students from grades 9 through 12 who reported entering a college or junior college have been combined to provide a mean score for approximately 1,500 institutions of higher learning. Using the Project TALENT students to represent those entering these institutions, it will be possible to compare various colleges and junior colleges.

The second study seeks to investigate the effects of birth order on aptitudes, abilities, interests, career plans, and type of post-high-school education sought after graduation. Data from twelfth-grade students who responded to the one-year follow-up are being employed to investigate these relationships.

The possibilities for research using Project TALENT data, including follow-up data presently available as well as that to be collected in the future, are virtually unlimited. Interested investigators are urged to consider utilization of this resource in their research programs.

Appendix I

Tables and Figures for Career Plan Changes

William W. Cooley

Table 1

Six-Category Classification Scheme

	Science-Technology		Nontechnical	
	(1) Physical	(2) Biological-Medical	(3) Nonbusiness	(4) Business
College	Mathematician Physical scientist Engineer Scientific aide	Biological scientist Nurse Physician Pharmacist Dentist Medical technician	Social scientist Social worker Clergyman Teacher	Accountant Lawyer Businessman Government Salesman
Noncollege	(5) Aviation Engineering aide Medical technician Skilled worker Structural worker		(6) Government Salesman Accountant Service worker Businessman Office worker	

Table 2

Career Group Self-Predictions
(Grade 9 Males)

	Follow-up Plans						
Grade 9 Plans	1	2	3	4	5	6	Grade 9 Totals
1. Physical science	965	291	378	545	121	79	2,379
2. Biological-Medical	106	377	173	213	29	37	935
3. Humanities	49	47	261	120	36	19	532
4. Business (C)	57	50	140	440	24	39	750
5. Technical	94	28	67	97	316	128	730
6. Business (NC)	36	27	72	178	93	125	531
Follow-up totals	1,307	820	1,091	1,593	619	427	5,857

42 per cent hits (underlined cells define "hits")

FIGURE 1
THE 36 CENTROIDS IN THE INTEREST SPACE

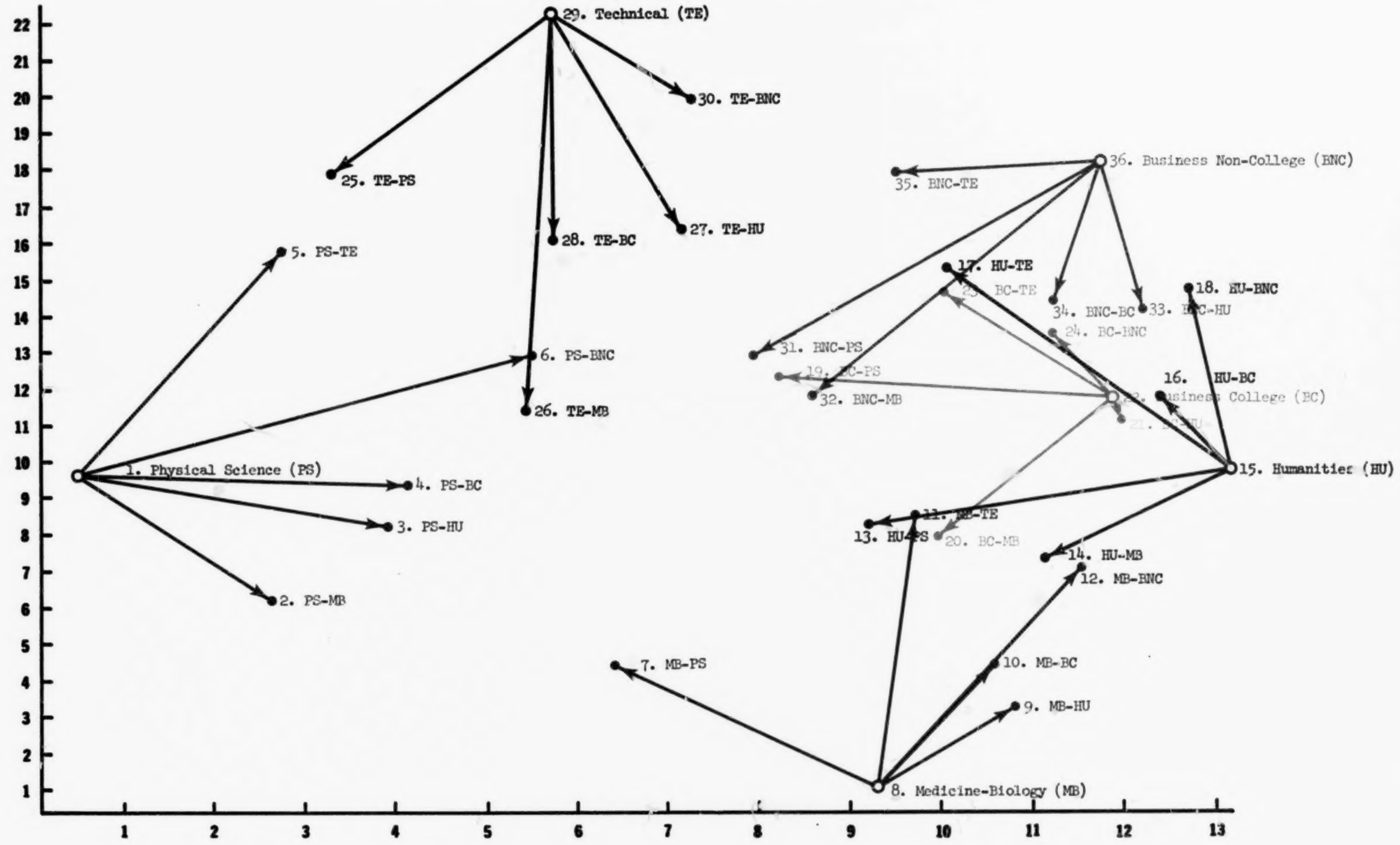

FIGURE 2
THE 36 CENTROIDS IN THE ABILITY SPACE

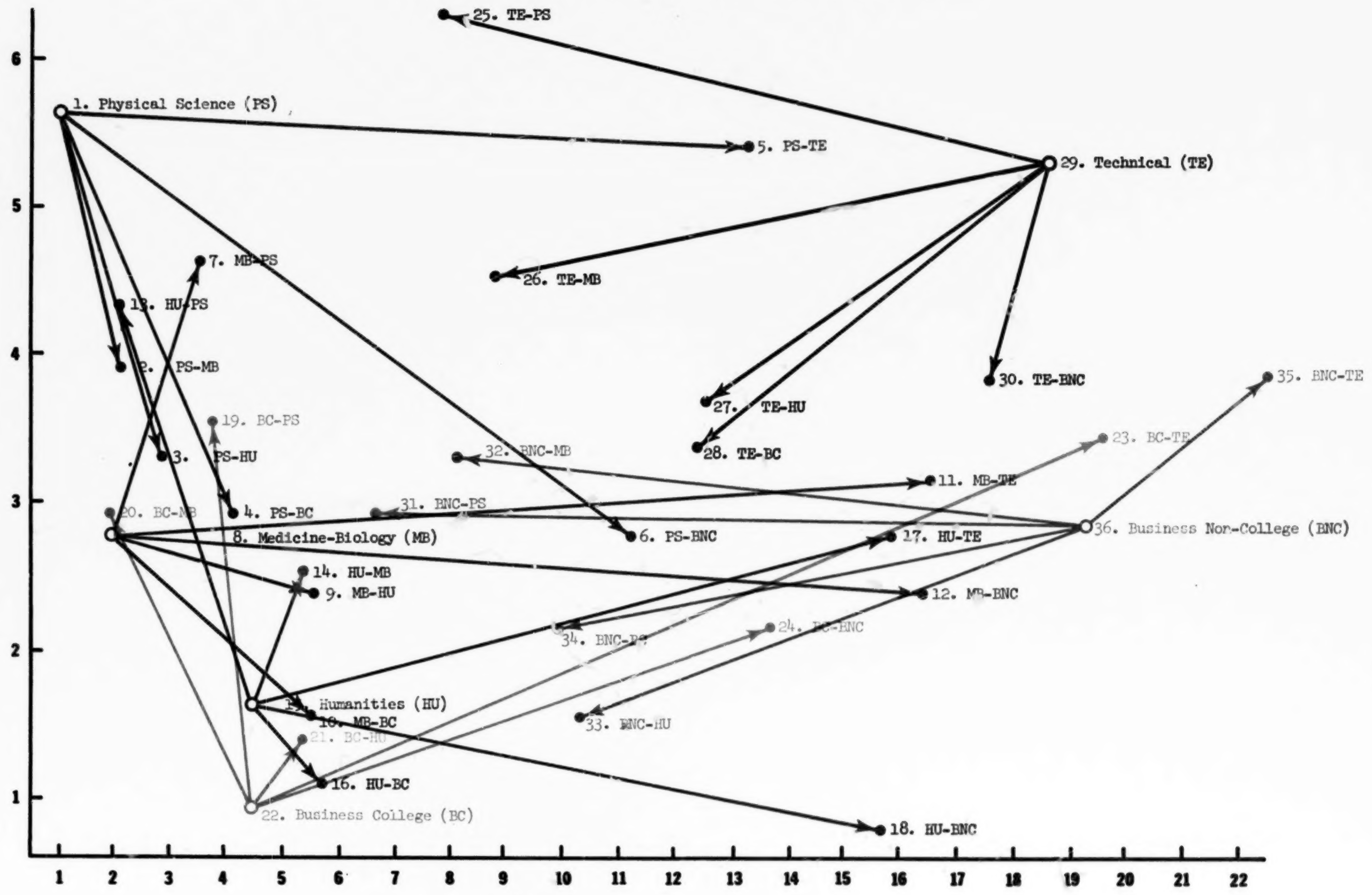

FIGURE 3
THE 36 CENTROIDS IN THE SAI SPACE